ROADS and STREETS

HIGHWAYS • BRIDGES • AIR FIELDS • HEAVY CONSTRUCTION

A GILLETTE PUBLICATION

Gillette Publishing Co.
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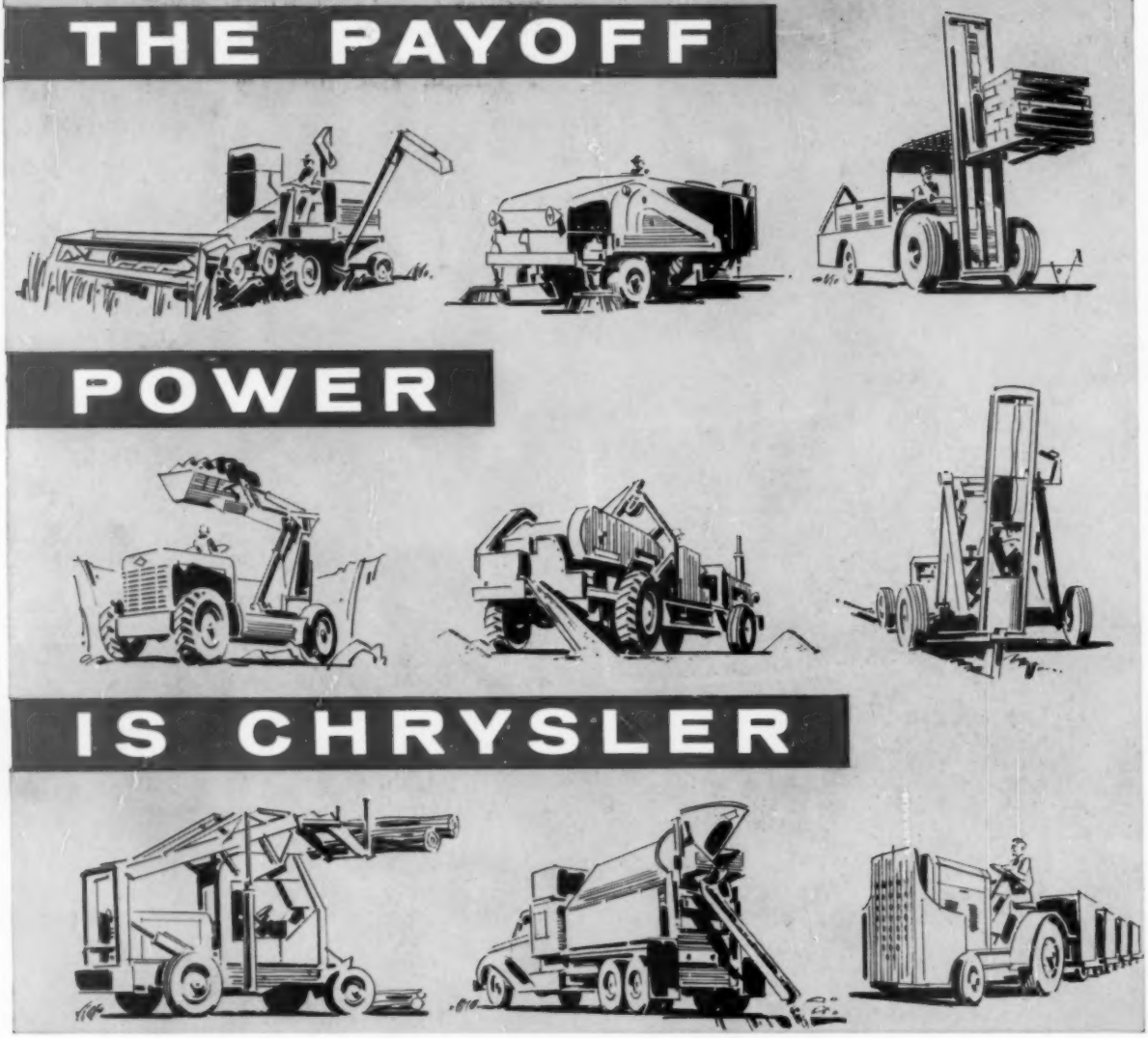
Cover Scene: Building fill out of the World's largest highway cut. . . In this Issue: Road Show Preview, special report on highway contracting, score of job reports and features.

January 1957

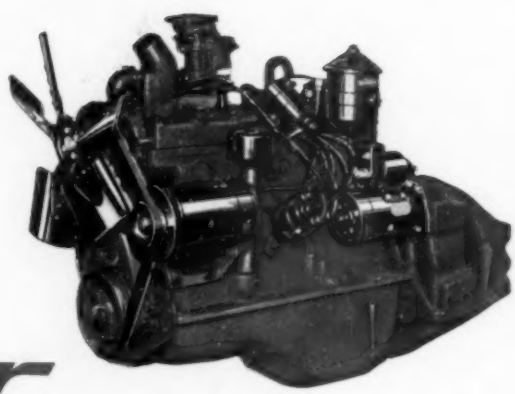
THE PAYOFF POWER IS CHRYSLER



In the oilfields of Texas and Oklahoma . . . in the timber country . . . farmlands . . . industrial areas . . . and on construction jobs large and small. Wherever big shouldered, hard driving power is required – there you'll find Chrysler Industrial Engines at work.

Look around. More and more manufacturers are powering with Chrysler when they build. More and more users are specifying Chrysler Power when they buy. Why? Because both have found that Chrysler produces more payoff power than any other industrial engine built today.

See a Chrysler Industrial Engine Dealer – listed in the yellow pages of your telephone book – or write for detailed information: **Dept. G-1, Industrial Engine Division, Chrysler Corporation, Detroit 31, Michigan.**



Chrysler

INDUSTRIAL ENGINES

INDUSTRIAL ENGINE DIVISION • CHRYSLER CORPORATION

. . . for more details circle 232, page 16

Economical 5-arch stream crossing made from Beth-Cu-Loy pipe

Bridges are not always expensive, as this interesting example shows. Here we see five 60-in. galvanized Beth-Cu-Loy culverts laid side by side, with concrete retaining walls to hold back 3 ft of roadway fill. The result: an economical, easy-to-build stream crossing that will last for years.

In a wide variety of jobs the versatility of Beth-Cu-Loy corrugated galvanized steel in drainage structures is gaining rapid recognition. This stems from a number of reasons of which strength, of course, is one. Light weight makes handling, shipping and installing less costly. Flexibility permits the pipe to flex with the fill, conform to grade and alignment, absorb impact, vibration and the action of shifting and freezing soils.

Beth-Cu-Loy is open-hearth steel, with a small amount of copper added to provide resistance to corrosion. As an additional protection, the Beth-Cu-Loy corrugated sheets are given a tight 2-oz coating of Prime Western zinc. Some corrugated steel drainage structures have been in service fifty years and more, outliving the original project, and they haven't said "uncle" yet!

Beth-Cu-Loy galvanized sheets conform to the rigid specs of the American Association of State Highway Officials. For further ideas on how this durable material might serve you and your community, just get in touch with any Bethlehem district sales office and they will direct you to one or more fabricators who use Beth-Cu-Loy Sheets.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor*: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

. . . for more details circle 300, page 16

ROADS AND STREETS

A GILLETTE PUBLICATION • JANUARY, 1957 • VOLUME 100 • NUMBER 1

Road Show Preview

NATIONAL AFFAIRS

EDITORIAL

SPECIAL STAFF INDUSTRY REVIEW

EARTHMOVING AND EXCAVATION

EQUIPMENT UTILIZATION

CONSTRUCTION JOB IDEAS

HIGHWAY ADMINISTRATION

PAVING AND SURFACING

AGGREGATE PRODUCTION

JOB ACCIDENT PREVENTION

DEPARTMENTS

WHERE TO BUY IT

Coming Articles

Choosing the Right Off-Road Tires *(brush-up course in latest tire developments)* . . . Salt Stabilization; Ohio's Early-Season Program *(contractors took readily to this work new in Ohio)* . . . 108 Ton Girders Set for Chicago Expressway *(tricky structural work through La Salle Depot)* . . . 22 Twin-Engine Units on Big Earthmoving Project *(Western Contracting put 365 units on turnpike grading job)* . . . Paver Cycle Stepped Up by Equipment Innovations *(new fast-dumping batch trucks successful on Ohio project)* . . . Blasting Precautions on Urban Expressway *(Guy F. Atkinson representative brief neighbors before shooting)* . . . Technical Happenings at Winter Conventions *(notes on AASHO Research Board and ARBA sessions; special review of happenings at The Road Show).*

Accepted as Controlled Circulation Publication at Milwaukee, Wisconsin. Published monthly. Subscription $5.00 per year.

BIGGEST CUT IN U.S. ROAD-BUILDING HISTORY

TO HELP BREAK CALIFORNIA BOTTLENECK

SECOND ONLY TO THE PANAMA CANAL in earth-moving magnitude, this 8½-million-yard cut will result in a canyon 1,370 feet wide and 350 feet deep at San Francisco's Carquinez crossing. Although much rock is being encountered, blasting is kept to a minimum and rippers and scrapers help keep the pace close to 30,000 yards per two-shift day! Goodyear 3-T Nylon Cord HARD ROCK LUG tires are taking this tough job in stride.

HOIST EQUIPPED RIGS make quick work of tire maintenance —help cut tire-cost-per-yard to new lows.

Another bottleneck broken!

TUBE AND FLAP TROUBLES ENDED FOREVER

with Triple-Tempered 3-T Nylon Cord

TUBELESS TIRES!

AIR DOESN'T SEEP THROUGH 3-T CORD BODIES — and Goodyear's mounting program is quick, safe, airtight, from smallest to largest sizes.

That's why Goodyear TUBELESS tires and rims are standard on foremost original equipment—and can be specified for *all* equipment.

But there's no need to wait. You can get all regular Goodyear features—plus the following TUBELESS advantages by changing over present equipment NOW:

No tube or flap troubles! No tube replacements! Easier mounting! Airtight assembly! Cooler running! Slow leaks instead of blowouts! Easier repairs! Simpler, re-usable valve parts! Simply contact your Goodyear dealer. Goodyear, Truck Tire Dept., Akron 16, Ohio.

NOW IN 3-T NYLON CORD — TUBE-TYPE OR *TUBELESS!*

Look for this nearby Goodyear dealer sign for better tire values—better tire care.

Buy and Specify **GOODYEAR**

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

Road Lug, Sure-Grip, All-Weather—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

. . . for more details circle 194, page 16

ROADS AND STREETS

Devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations; the construction and maintenance of airports. Represents 64 years of continuous publishing in the highway field; combined with Engineering and Contracting and Good Roads Magazines, established in 1892.

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Equipped with 8-ft. dozer-blade, D Tournapull not only loads, hauls, spreads, but can also doze truck-dumped fill — doing double-duty. Blade is raised for scraper work.

Naval Air Station

one of 42 jobs in 27 months

for 3 "Handyman D's"

Ask Bob Forrester, owner of Reca Construction Company, Gardnerville, Nev., about the speed and versatility of his 3 D Tournapulls, and he will show you their outstanding work record—42 jobs in 27 months! Jobs varied widely in size and type. But on all of them, versatile "D's" handled dirtmoving assignments fast, efficiently, and at low cost for Forrester.

Grade for Naval Air Station

On the project shown here, Reca Construction's "D's" cleared and leveled the site for expansion of the Naval Air Station at Fallon, Nev. More than $3.5 million was spent by the U. S. Navy to improve old facilities and construct new ones at Fallon. Included were buildings, utilities, and additional aircraft parking space, amounting to 50,000 sq. yds.

Before any construction could begin, 127,000 cu. yds. of sand had to be moved to level the site. Reca sub-contracted to do the basic clearing work in 90 days.

3 "D's" average 9 trips hourly on 4.4-mi. cycle

Bob Forrester of Reca brought in 3 D Tournapulls, 3 Super "C's", four crawler-tractors and a grader for the job. Half the work-time was spent hauling borrow. Length of average one-way borrow-to-fill hauls was 3000'. Scrapers also removed unsuitable material from the site, and hauled in select sand to fill.

On one long haul, over a 4.4-mi. cycle, each D 'Pull averaged 3 loads per hr. Here Tournapull's rubber-tired speed paid real dividends in lower costs and time savings.

LeTourneau-Westinghouse machines handled 101,600 yds. — 80 per cent of the total sand moved. With dirtmoving production like this, Forrester's contract time-limit of 3 months was easily met.

Cut costs 30% on housing project

On another project—leveling land and grading streets in a housing project at Mountain Home, Idaho—Reca's D Tournapulls out-performed four competitive machines of larger capacity. Highly-maneuverable "D's" cut costs 30 per cent. Tight dumping and spreading areas —plus strict compaction requirements — made D Tournapull the only logical, economical tool.

Forrester has also used his "D's" as gravel-spreaders on highway projects. Operators spread a thin, smooth coating of gravel as they drove loaded rigs down road-sections at high speed.

Versatile "D's" handle many jobs

In land-leveling, the "D's" pulled heavy, land-planes. In land-clearing, they uprooted trees. Here chain was linked from scraper to lower trunk. 138 hp "D" then pulled complete tree from the ground, roots and all. Rigs also picked up sagebrush, which had been windrowed, and hauled it away for burning.

Forrester is very pleased with his Tournapulls' versatility and performance. "Ease of operation is good with the 'D's'," he says. "It's a versatile machine for many different operations."

More information available

Improved D Tournapull now available, can cut costs and speed work on *your* contracts. "D" has 9-yds. heaped capacity, 8' width, and permissable axle-load . . . requires no special road permit. Call or write us for information.

One of Forrester's "D's" hauls at high speed at Fallon on clean-up phase of job. Tournapull "Handyman" does an efficient job of smooth-finishing, as well as moving big-yardages.

Tournapull—Trademark Reg. U.S. Pat. Off. DP-930-8-b

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

WHERE QUALITY IS A HABIT

. . . for more details circle 247, page 16

● *Those are the benefits you enjoy when you lubricate engines with* ***Texaco Ursa Oil Heavy Duty.*** *As the name implies, it's made especially for tough service.*

Texaco Ursa Oil Heavy Duty is fully detergent and dispersive, and highly resistant to oxidation. It keeps engines clean, prevents rust and minimizes wear. With *Texaco Ursa Oil Heavy Duty* rings stay free to assure full compression and complete combustion. You get *more power* with *less fuel* over *longer periods* between overhauls. There is a complete line of *Texaco Ursa Oils* to meet all requirements.

For your air compressors, use *Texaco Regal Oil R&O*. It keeps systems clean, lines clear—assures dependable performance.

For your rock drills, use *Texaco Rock Drill Lubricant EP*. It guards against wear and prevents rust whether drills are running or idle.

Let a Texaco Lubrication Engineer help you simplify and improve your lubrication. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N.Y.

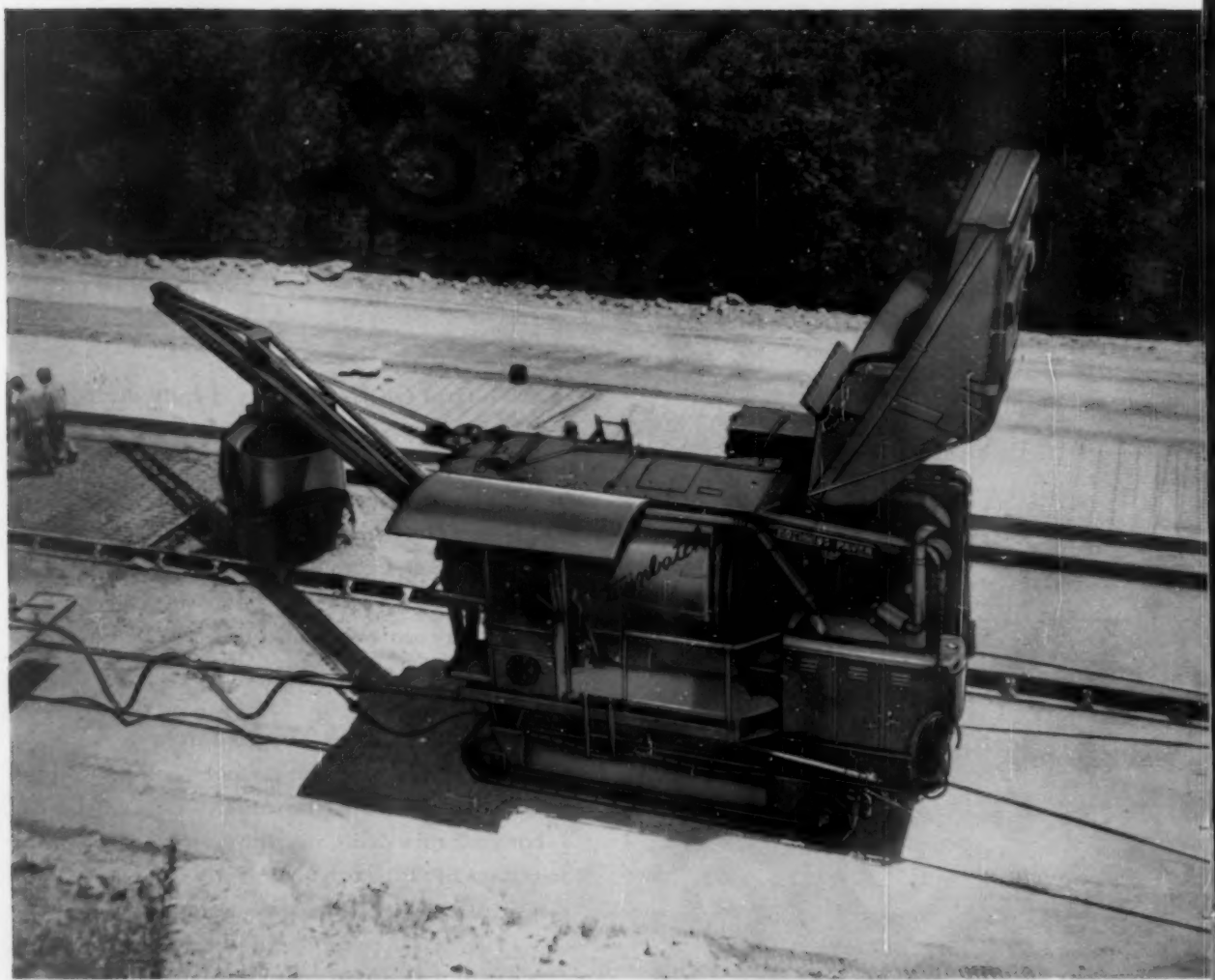
TEXACO SIMPLIFIED LUBRICATION PLAN

Enables you to handle all your major lubrication with no more than six Texaco Lubricants. Ask your Texaco Lubrication Engineer for details.

Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

. . . for more details circle 211, page 16



Pouring concrete in strips 12 feet wide on a new expressway, Koehring 34-E *twinbatch* paver averaged 1100 feet per 8-hour day. 10-inch slab consisted of 8-inch mesh-reinforced base, 2-inch top course.

PLAN YOUR SPREAD FOR

the heavy paving program ahead

Long-range outlook on the extensive road program, and new "jet-age" airbases, indicates a steadily-rising curve of construction activity in all areas. It also indicates plenty of paving business ahead for the contractor who is in a position to compete favorably in the bidding, and who can profitably complete contracts *on schedule.*

In planning your equipment spread, you can't afford to gamble on the production end of your job — *at the paver,* where every second counts. That's where the *reserve* production capacity of a Koehring 34-E *twinbatch*® protects your schedules and profits. It hits a top output of 86.7 batches an hour, on 60-second mixing cycle. This lets you pick up any lost time, when you need it, to offset normal job and material delays — maintain a high *average* speed throughout duration of the job — keep batch plant, trucks and finishers working at peak efficiency. With *twinbatch* Autocycle control, every mixing operation is automatic, accurate, and fast. Drum charging, mixing, transfer and discharge are all synchronized by Koehring Batchmeter, a simple timing device. 8-second skip-hoist speeds charging. Big, double-door bucket and wide-swinging boom speed concrete distribution on the grade. What's more, accessibility of every paver maintenance point, plus heavy-duty construction, all help to keep paving jobs rolling *on schedule.*

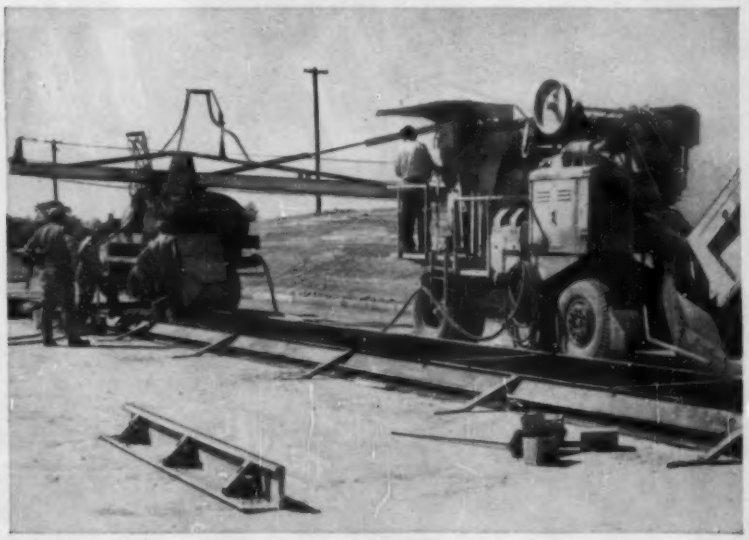
You'll find there's no substitute for the steady output, speed and economy you can get with 34-E *twinbatch* pavers on your big-production highway and airport contracts. Talk it over with your Koehring distributor. He has more information that will interest you. Why not call him *today?*

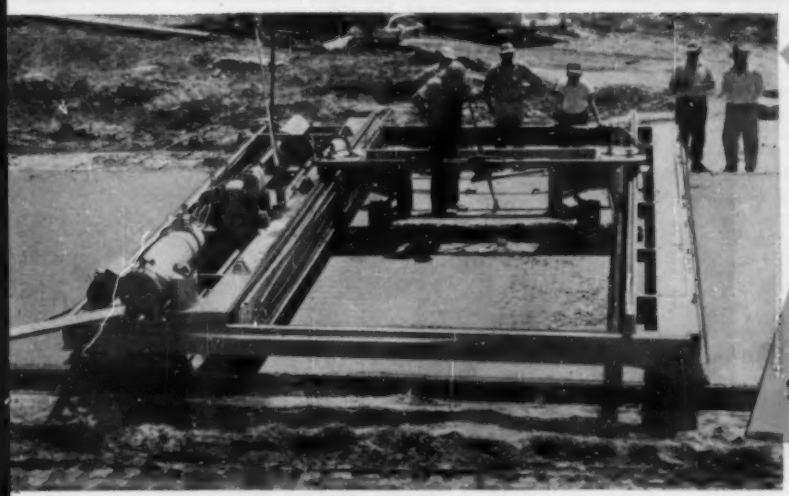
34-E *twinbatch* team works side-by-side on big U. S. airbase

Widening runways on a military airstrip, contractor completed job "on the double" with a pair of big Koehring 34-E *twinbatch* pavers. Notice how one long-boom 34-E poured the outside half, while the other poured the inside half of the strip. For balanced, high rate of production at *both ends* of the job, many contractors team up *twinbatch* pavers with C. S. Johnson automatic batch plants (another Koehring product worth checking). Clamshell cranes, finishers also available in big Koehring paving "package".

Mobile 16-E paves center-strips, intersections, bridge-approaches

On street and highway jobs, there's always extra concrete to be laid in addition to the main slab, such as curbs, gutters, center-strips, scattered intersections, approaches to driveways, bridges and side-roads. Consider the time-saving flexibility you can get with a rubber-tired *twinbatch* in your paving spread. This Koehring 16-E is as mobile as your batch trucks — can get back on the new slab *in as little as 7 days* to do clean-up work, or pave adjoining strips. Also has high elevated discharge, pours into overhead hoppers, forms, chutes. You'll find its usefulness unlimited as a utility unit . . . or as a general-purpose paver.





"Timely" precision-finishing —

is important on every paving job. Operating at almost twice the speed of a 34-E paver, Koehring Longitudinal Finisher handles all practical consistencies of concrete — harsh, wet or dry — produces smooth, mechanically-accurate slab with uniform crown transitions.

KOEHRING Company

Milwaukee 16, Wisconsin

KOEHRING HEAVY DUTY

Subsidiaries and divisions: JOHNSON • PARSONS • KWIK-MIX • KOEHRING OF CALIF. • BUFFALO SPRINGFIELD • KOEHRING-WATEROUS LTD. • HYDRAULIC PRESS

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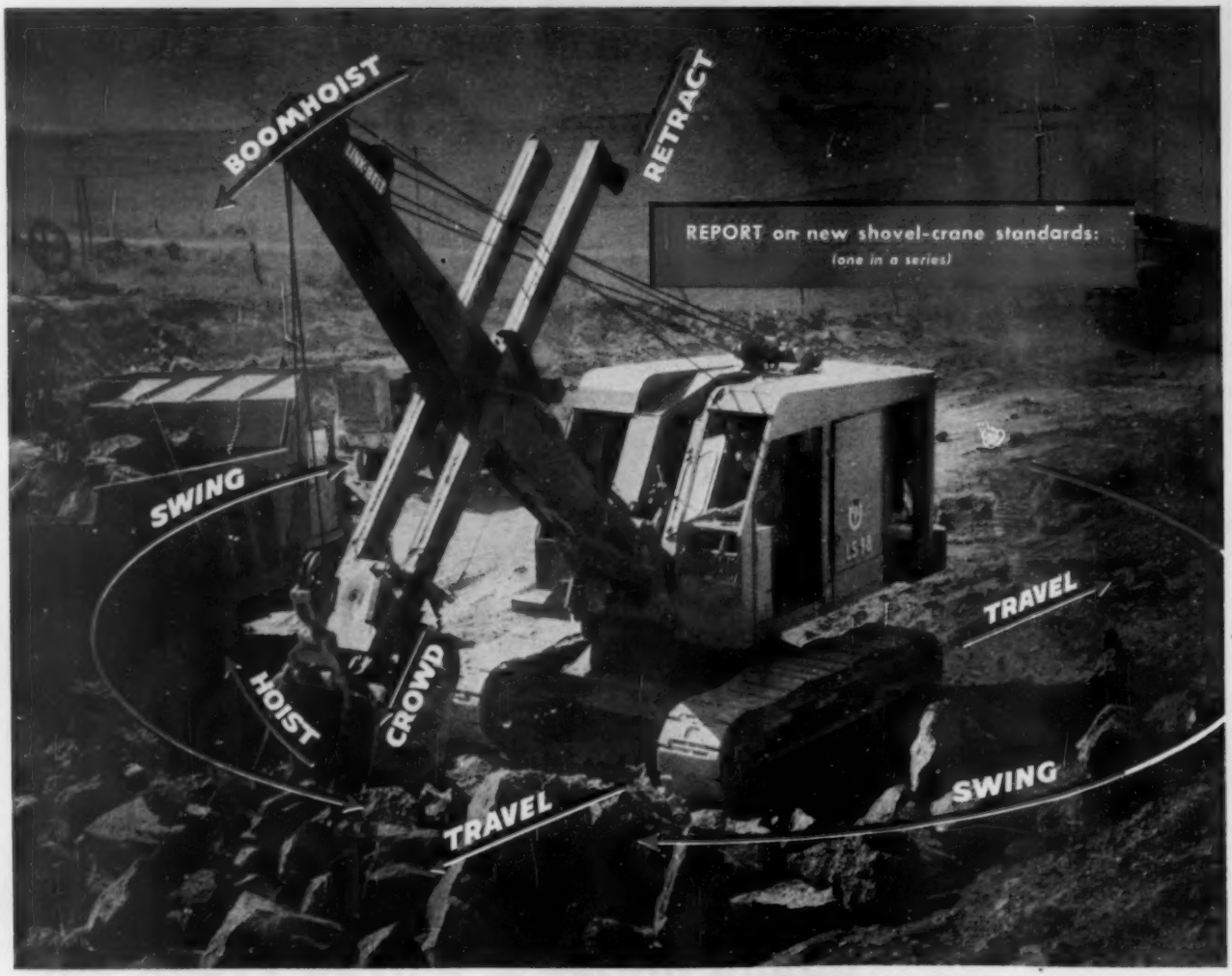
Producing 9 hours'



ALL OPERATIONS ARE COMPLETELY INDEPENDENT — In addition to eliminating shifting time, *Independent-Travel* allows the operator to swing and hoist the load while travelling. Whether to save time or to jockey the boom around obstacles, the operator can swing the boom while his machine is travelling in either direction. This optional feature can be used with any front-end attachment.

MORE USABLE HORSEPOWER — Size for size, Link-Belt Speeder shovel-cranes utilize more of the engines' available horsepower. This bonus pays off in added power at the bucket teeth, greater line pull plus extra power to swing, hoist and travel. Although it gets more usable power and line pull out of the same engines used in other shovel-cranes, a Link-Belt Speeder remains well within the engine manufacturers' recommended operating speeds.

output in 8 hours...

Independent-Swing-and-Travel is available on 11 Link-Belt Speeder models. Eliminates shifting . . . saves 20-30 seconds each machine move

Users of Link-Belt Speeder shovels, hoes, draglines and cranes are setting new high production standards by equipping their machines with *Independent-Swing-and-Travel.* This optional feature eliminates time losses ordinarily occurring when operators shift from swing to travel and from travel to swing. With *Independent-Travel,* shifting is eliminated and the machine can travel and swing simultaneously.

Speed, maneuverability, safety

Owners of machines equipped with *Independent Travel* report that the feature gives them higher percentage of work time spent in actual productive effort. What's more, they say it greatly decreases operator fatigue, keeps end-of-the-shift *output* at previously impossible high levels. In addition, because all operations are independent of each other (as shown in illustration at left) the machine maneuvers more readily in tight quarters and is able to move away from bank cave-ins in split seconds.

80 extra yards a day

Here's a conservative comparison of what happens when a Link-Belt Speeder 1-yard hoe with *Independent-Travel* is matched against an equal-sized ordinary hoe:

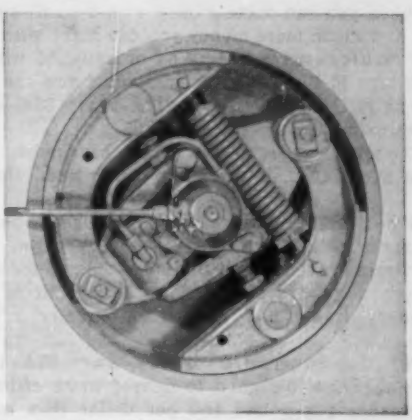
> Digging to a depth of 6 feet, with each machine averaging a move every 7 feet, the Link-Belt Speeder with *Independent-Travel* eliminates shifting, producing an extra 80 to 90 yards, digging an added 120 lineal feet of trench per 8-hour shift because it has converted shifting time into work time!
>
> Figured at 35 cents a yard, it earns an increased return of about $30 per shift or more than $600 extra each 20-day working month.

Cuts maintenance bills

The design of *Independent-Travel* calls for separate power trains, separate clutches, shafts, gears and bearings for swing and travel. As opposed to ordinary machines — which have but one power train to perform both functions and therefore have these components in almost constant use — the Link-Belt Speeder with *Independent-Travel* separates the functions . . . divides total wear over two power trains. Life of shafts, clutches, gears and bearings is practically doubled.

This is but one of many reasons why Link-Belt Speeder machines are completely revising existing standards of high-speed, high-profit shovel-crane operations. Contact your Link-Belt Speeder distributor or write: Link-Belt Speeder Corporation, Cedar Rapids, Iowa. 14,325

SIMULTANEOUS SWING AND TRAVEL — *Independent-Travel* eliminates shifting from swing to travel, from travel to swing and provides completely independent control. And fingertip-operated Speed-o-Matic — the only true power hydraulic system—makes every shovel-crane movement fast, easy, positive. With a flick of the wrist the operator puts his machine through its paces. There is little, if any, end-of-the-shift letdown.



LESS MAINTENANCE — Self-compensating hydraulic piston automatically adjusts the clutches . . . eliminates operator's daily clutch adjustments for heat expansion and normal lining wear. With Speed-o-Matic, hydraulic pressure does the job.

SEE ALL THESE FEATURES AT THE ROAD SHOW—BOOTH 509

It's time to compare . . . with

LINK-BELT SPEEDER

Builders of a complete line of shovel-cranes . . . with exclusive Speed-o-Matic power hydraulic controls

. . . for more details circle 265, page 16

Announcing the all new 4/10 yard, 8½ ton

85A "QUICK-WAY"...

When you can make money with a small outfit, think how much more money you can make with the husky *"QUICK-WAY"* 85A. Why be satisfied with a 6 or 7 tons in the 3/8 yard class when you can get 8½ tons in the 4/10 yard *"QUICK-WAY"* 85A—and for approximately the same price.

The new *"QUICK-WAY"* 85A has more Big Shovel Features than any other in the small shovel field.

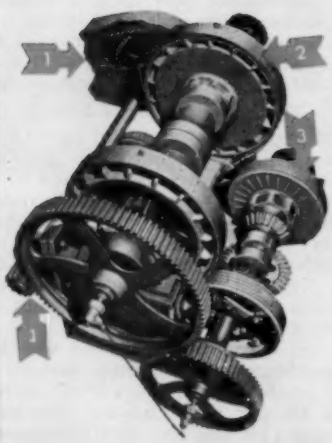
It has been engineered to meet rugged, heavy-duty specifications with fewer moving parts. The power train is oversize, all shafts are splined for easy maintenance. Extra strength has been built in the machinery frame and gantry for greater lifting power.

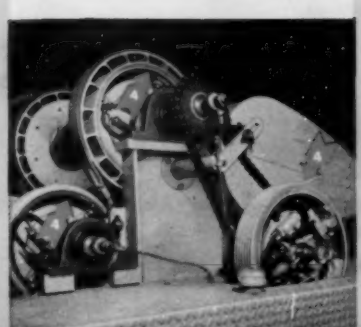
For the owner, the *"QUICK-WAY"* 85A is a quality machine, designed to deliver more efficient performance per pound and per dollar than many more costly machines.

For the operator, the *"QUICK-WAY"* 85A has been simplified for easy, economical maintenance of all parts. It operates smoothly and quietly for maximum production and minimum operator fatigue.

You owe it to yourself to see the new *"QUICK-WAY"* 85A before you buy any shovel at any price. See your distributor for a demonstration and get the real facts on how you can make more money with the husky *"QUICK-WAY"* 85A.

THE ONE SMALL





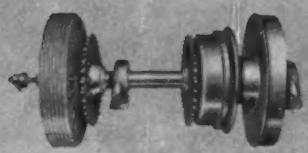
1. **SIMPLIFIED CHAIN AND GEAR DRIVE** for efficient, quiet operation—the combination of roller chains and precision machined gears gives efficient transmission of power through the minimum number of moving parts. This simple, efficient design provides quiet, low-maintenance operation. Stand. engine 47 HP @ 1800 rpm.
2. **MAIN HOIST AND HAUL BACK DRUMS**—are mounted on a single, accessible shaft with sealed anti-friction bearings. Two-piece cast laggings are easily changed for different operations. Large clutch and brake drums have separated surfaces with louvres for cooling.
3. **LARGE SWING DRUMS** are ribbed for cooling—and are mounted on a king-sized horizontal swing shaft. Swing brakes are optional. Vertical swing shaft is mounted in double anti-friction bearings at top with an anti-friction needle roller bearing at bottom. One-piece, bonded brake linings provide more surface for smoother, cooler operation.
4. **OVERSIZE CLUTCHES** have more surface—for smoother, positive action. All clutches are hydraulically operated for easy, sure application of power. Hydraulic clutch controls operate with minimum effort and give the operator the feel of the load at all times.

"QUICK-WAY" TRUCK SHOVEL CO.
A Penn-Texas Subsidiary DENVER, COLORADO

. . . and the all new "QUICK-WAY" CRAWLERS 85 AC & 105 AC

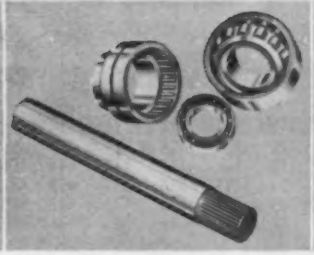
New you can get the *"QUICK-WAY"* 85A and 105A on a crawler! You get the same *"QUICK-WAY"* Big Shovel Features on the crawler that gets to its job, stays with the work, even in close, restrictive quarters. The new *"QUICK-WAY"* Crawler has independent travel—forward and reverse speeds of 7/8 miles per hour in low range and 1-3/4 miles per hour in high range. It is now available in 16" crawler shoes (5.1 psi ground pressure), 24" crawler shoes (3.5 psi ground pressure), and 32" crawler shoes (2.5 psi ground pressure). Width of 95" has been especially designed for hauling on trailers.

SHOVEL WITH BIG SHOVEL FEATURES



POWER UP AND DOWN BOOM HOIST IS STANDARD — A simple precision design makes safe, sure operation. A one-piece cast steel unit contains pawl teeth, windlass and brake drum. The cable end is located in an easily accessible place for quick attachment change-over.

ONE-PIECE FLOOR FRAME, HEAVY DUTY SWING TABLE GEAR AND HOOK ROLLERS—Floor frame electric welded in jig, then all bearing mounts machined at one time for precision alignment. One-piece, cast steel swing table gear. Four hook rollers distribute load.



ALL SHAFTS SPLINED, ALL ANTI-FRICTION BEARINGS — All shafts extra large for maximum strength, precision splined for easy maintenance. Anti-friction bearings used on all high-speed, continuous rotating shafts and drums. All shaft bearing surfaces are precision ground.

MACHINERY HOUSING DESIGNED FOR COMPLETE, EASY ACCESS—to all machinery. New feature is an automobile hood-type cable trough cover that lifts high for complete access to central machinery. New cab has 360° vision through removable safety-glass windows.

THE MOST COMPLETE LINE . . . WITH 5 MODELS IN THE SMALL SHOVEL FIELD!

105A & 105AC
5/10 YD., 10½ TONS

125A
6/10 YD., 12½ TONS

with the famous money-making line of "QUICK-WAY" attachments for all models.

. . . for more details circle 227, page 16

Get these important books . . . free!

- ☐ The new catalog on the *"QUICK-WAY"* 85A and 85AC Crawler.
- ☐ The new catalog on the *"QUICK-WAY"* 105A and 105AC Crawler.
- ☐ The new catalog on the *"QUICK-WAY"* 125A.

"QUICK-WAY" TRUCK SHOVEL CO., Dept. 67
2401 East 40th Ave., Denver 5, Colorado, U.S.A.

Name.....*Title*.....

Company.....

Address.....

City and State.....

WHAT'S NEW in Equipment and Materials

Water Cooler for Engineer's Shacks

Ease of installation, portability and small size are claimed to make a new water cooler, introduced by Cordley & Hayes, 443 4th Ave., New York 16, N. Y., ideal for use in construction and engineering job site shacks.

The unit required no plumbing and can be connected to any 115 volt, 50 or 60-cycle AC line. It can also be operated from any portable generator having sufficient starting power for the cooler's ⅛ hp. compressor. This makes it possible to use the cooler on jobs where a regular power supply is not available, such as in highway construction.

Weighing only 70 lb., the cooler occupies only a square foot of floor space. The unit cools as many as 2.9 gal. of water per hour at 90° room temperatures.

For more information circle 101 on Service Coupon this page and mail now.

Paint Service for Construction Equipment

A new paint service for construction equipment manufacturers, distributors and users has been announced by Body Bros., Incorporated, Bedford, O. The company has established a special division to study specific problems relative to equipment finishing. Upon request, its field engineers will check conditions under which equipment operates to establish the necessity for rust proofing; resistance to acids, alkalis, industrial fumes and salt air; high night visibility, abrasive resistance, etc. Findings will be analyzed in Body Bros. laboratory and definite recommendations made.

The company is also equipped to perfectly match any original equipment colors utilized by machinery manufacturers for brush, dip or spray applications. Furthermore, its technicians are constantly creating new colors or shades for manufacturers and users who wish to impart distinctive identification to their equipment.

For more information circle 102 on Service Coupon this page and mail now.

G M Diesels on Michigan Tractor Shovels

Clark Equipment Company's Construction Machinery Division, Pipestone Road, Benton Harbor, Mich., is offering General Motors diesel engines as optional power plants on two models in its Michigan tractor shovel line.

The Michigan 175A is now available with a Detroit diesel engine Division Model 4-71 engine. Rated at 147 brake horsepower at 2200 rpm, the four-cylinder engine has a displacement of 283.7 cu. in. Maximum torque is 366 lb.-ft. at 1600 rpm. Weight of the Model 175A with the new engine is 24,550 lb.

Detroit Diesel's model 3-71 is offered in the Michigan 125A tractor shovel. The three-cylinder, 212.8 cu. in. engine is rated at 105 bhp. at 2200 rpm. Maximum torque is 275 lb-ft. at 1500 rpm. The model 125A weighs 19,340 lb. with the new diesel.

For more information circle 103 on Service Coupon this page and mail now.

Diesels Operate on Low Cost Fuel

An improved series of industrial diesel engines, in ratings up to 1025 hp., which can operate exclusively on low-cost fuels, has been developed by White Diesel Engine Division, White Motor Co., Springfield, O.

The model 40 superior diesel engines, available naturally aspirated or supercharged, are designed for use in heavy equipment like power shovels, as standby power for industrial plants and telephone companies and mobile power for utilities. Portable engine generator sets range to 600 KW capacity.

The new heavy-duty models are built as 4-cycle, 6 or 8-cylinder, vertical, in-line engines but they are stated to provide power equal to other engines with more cylinders.

Output of the engines ranges from 215 to 1,025 hp. The latter represents nearly a 50 per cent increase over a top capacity of 700 hp. in the previous line. Yet the new supercharged engines are the same size as the previous models.

For more information circle 104 on Service Coupon this page and mail now.

More equipment news pages 104, 176, 225

Torque Converter Fluid

A completely new and different type torque converter fluid, designated D-A Torque Fluid, claimed to eliminate seal shrinkage and hardening and to reduce varnish deposits to an absolute minimum, has been announced by D-A Lubricant Co., Inc., 1331 West 39th St., Indianapolis, Ind.

The new Type C torque fluid contains a new lubricating oil additive, stated to not only eliminate seal shrinkage and hardening but also to control seal swelling to less than 0.2%. It also contains an entirely new high-temperature oxidation inhibitor that reduces almost to the vanishing point the customary sludge and varnish deposits on blades, pumps, valves and other moving parts of the torque converter—even at highest permissible operating temperatures.

Pour point of the new torque fluid is minus 35 degrees F., thus assuring adequate lubrication and peak performance during the coldest winter weather.

For more information circle 105 on Service Coupon this page and mail now.

(Continued on p. 104, 176, 225)

MAIL THIS COUPON TODAY!

ROADS & STREETS
22 West Maple Street
Chicago 10, Illinois

CIRCLE THE NUMBERS AND MAIL NOW!

Please send me further information on products and materials mentioned in the January Roads & Streets as circled below

About New Equipment and Literature:

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Street_____

City_____ State_____ 1-57

NOT GOOD AFTER FEBRUARY 15, 1957

A READER SERVICE FOR YOUR NEEDS

AGAIN NORTHWEST
Leads the way on another Turnpike!

Already 41 NORTHWESTS on the Connecticut Turnpike!

	Slattery Contracting Co.	4 Northwests
1	Lizza & Sons, Inc.	3 Northwests
2	Peter W. Kero, Inc.	2 Northwests
	L. G. Defelice & Son	6 Northwests
	D'Addarrio Construction Co.	2 Northwests
3	Poirier & McLane Corp.	5 Northwests
	D. V. Frioni and Co., Inc.	5 Northwests
4	Edward J. Petrillo	5 Northwests
	M. A. Gamino Construction Co.	4 Northwests
5 & 6	Peter Mitchell, Inc.	4 Northwests
	Savin Construction Corporation	1 Northwest

NORTHWEST ENGINEERING COMPANY
1504 Field Building, 135 South LaSalle Street
Chicago 3, Illinois

S80-10-1

OVER HALF THE SHOVEL EQUIPMENT ON THE WEST VIRGINIA TURNPIKE WAS NORTHWEST

WELL OVER 100 NORTHWESTS —MORE THAN ANY OTHER MAKE —ON THE NEW YORK THRUWAY

OVER 20 NORTHWESTS ON THE MAINE TURNPIKE EXTENSION

57 NORTHWESTS—MORE THAN ANY OTHER MAKE — ON THE MASSACHUSETTS TURNPIKE

OVER 60 NORTHWESTS—MORE THAN ANY OTHER MAKE—ON THE OHIO TURNPIKE

PRODUCTION PLUS MEANS MONEY

PLAN TO BE AT THE A.R.B.A. ROAD SHOW CHICAGO JAN. 28—FEB. 2, 1957

. . . for more details see . . . page 16

NORTHWEST

CRAWLER and TRUCK MOUNTED SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

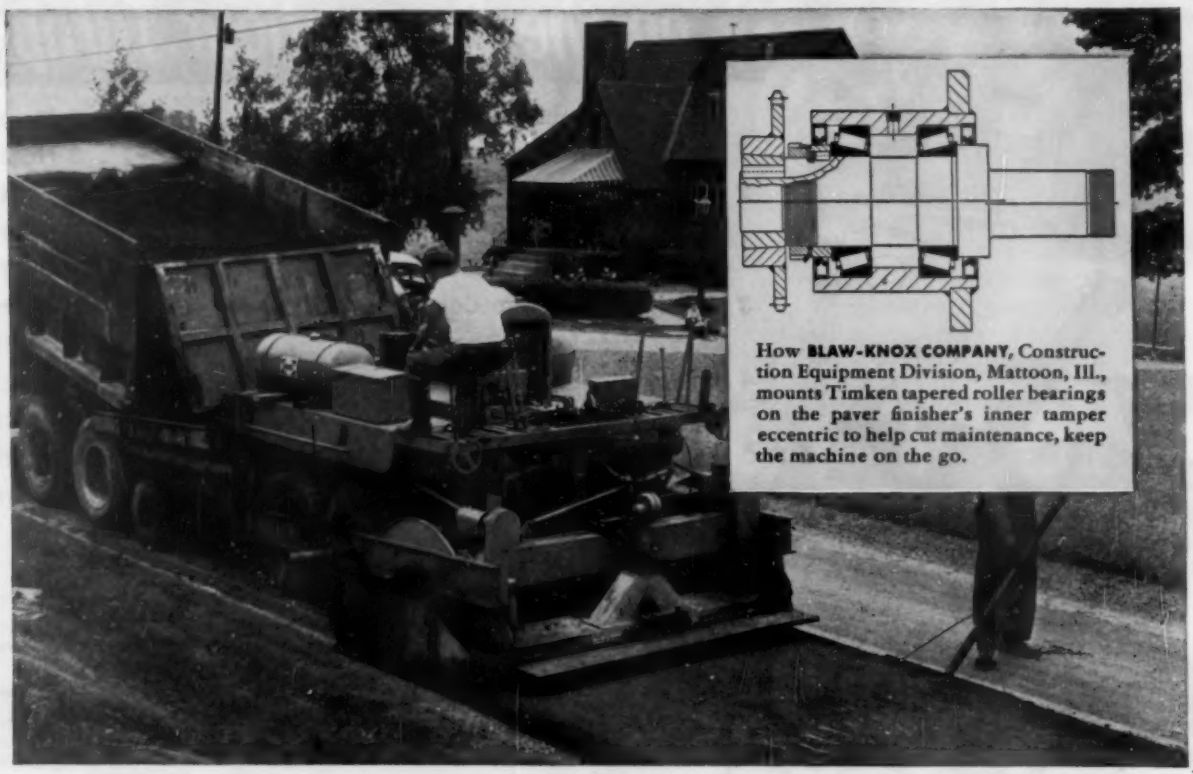
91 TIMKEN® bearings help paver finisher lay "black top" faster, cut downtime

THE first rubber-tired paver finisher to have a floating screed combined with a tamper, this 12¼-ton Blaw-Knox unit lays 10 tons of black top at speeds up to 55 feet per minute. Shock loads are heavy and constant. To take these destructive loads and prevent costly breakdowns, Blaw-Knox uses *91* Timken® tapered roller bearings in these highly important locations: power take-off clutch, transmissions, differential axle, wheels, tamper and tamper drive, conveyor idler, auger drive and control mechanisms.

Timken bearing rollers and races are case-carburized to provide a hard, wear-resistant surface over a tough, shock-resistant core. Because of their tapered construction, Timken bearings take *both* radial and thrust loads in any combination. And full line contact between rollers and races gives Timken bearings extra load-carrying capacity. They keep the machine operating smoothly, minimizing wear and keeping adjacent parts operating at top efficiency. Timken bearings last longer, need less maintenance.

Easy bearing adjustability permits maintaining original clearances. To be sure of the finest bearings, we even make our own steel. We're America's only bearing manufacturer that does. All these advantages are yours when you specify Timken bearings for the machines you buy or build. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



How **BLAW-KNOX COMPANY**, Construction Equipment Division, Mattoon, Ill., mounts Timken tapered roller bearings on the paver finisher's inner tamper eccentric to help cut maintenance, keep the machine on the go.

SEE YOU AT THE

American Road Builders' Association Road Show

Space 816 Donovan Hall, Second Floor

International Amphitheatre, Chicago

JANUARY 28 TO FEBRUARY 2, 1957

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS ROLL THE LOAD

. . . for more details circle 254, page 16

ROADS AND STREETS
Sixty-Four Years of Editorial Leadership

Washington News Letter

By Duane L. Cronk January 10, 1957

1957 opened with a rush here in Washington. And the National Highway Program immediately moved back into the headlines as a subject of major importance.

● Congress convened with expressed intentions of investigating the progress of the big $50-billion federal-aid roadbuilding endeavor. Senator Albert Gore of Tennessee, chairman of the Senate Subcommittee on Roads, has declared that he wants a good look at how fast the BPR and the states are bringing work to the contract stage. There will undoubtedly be Congressional hearings this month and criticism of bottlenecks hampering full production, such as the failure of some states to recruit engineers aggressively and the shortages in steel and cement.

(Some senators are still unsatisfied with the present federal organization set up to direct the national roadbuilding effort. There will probably be more talk of reorganizing the Bureau of Public Roads and pressure to appoint three commissioners, instead of one federal highway administrator.)

● The name of the new federal administrator, Bertram D. Tallamy, will be submitted for Senate approval within the next few days. The top U.S. highway official's job will be to properly administer the federal highway-aid funds, to oversee the diverse activities of the Bureau of Public Roads, to act as the Administration's liaison with Congress and to represent the national interest in dealings with state highway directors.

● In the BPR, experts are working hard to complete research assignments the Congressmen threw in its lap before adjourning last session. First reports are scheduled for release soon, will be highly significant to roadbuilders.

● The Department of Labor is busily building up a staff of wage scale examiners who will "check up" on contractors with Interstate jobs, where area prevailing rates must be paid. The department has already made 500 determinations of prevailing wage, will be making 2,500 a year when contract lettings mount higher for Interstate projects. The department estimates it will need $300,000 and a 25% staff increase to handle the highway wage load.

* * *

The November elections had little effect on Congressional committees which will consider new highway legislation this session. With the Democrats still in majority, Senator Gore will again steer the Senate Subcommittee on Roads. Congressman George Fallon of Baltimore will be back as chairman of the House counterpart. Both are well versed on America's highway needs and eager to see the billions of dollars authorized last year turned into actual pavement.

(continued on next page)

The rigid money market is exerting an increasing effect on highway construction. The tightening of the bond market has boosted interest rates on some state highway program issues and postponed others. The result - higher costs on projects launched with borrowed money.

- In Michigan, a turnpike authority official pointed out that the state recently failed to draw a single bid for $52 million worth of expressway bonds at 3½% interest. "Increasing interest rates on highway bond issues," he said, "will erase, or substantially delay, many highway improvements hoped for in Michigan after enactment of the recent State gas tax increase and the Federal highway program."

- In Florida, a $185-million issue for construction of a state-long toll road has been postponed until the market is more favorable. In Connecticut, Ohio, New York and other states, the prospect of costlier financing threatened roadbuilding projects.

* * *

A new task force, to appraise the effect of the tight money situation on roadbuilding, has been named by Executive Vice President Louis A. Prentiss of the American Road Builders Association. ARBA, which has distinguished itself in reporting highway industry capacities to Congress, will put the new task force to work surveying the extent to which states will need to float bond issues to match future federal aid, and the possibility of tight money becoming a bottleneck to construction.

The committee will study, also, the credit needs of all segments of the highway industry - contractors, materials producers and equipment manufacturers. There must be an easy flow of money so suppliers can expand their production plants quickly, ARBA believes, and so contractors can meet their equipment and materials needs promptly and at reasonable financing cost.

* * *

Steel production capacity may be sufficient within another nine months to keep pace with construction needs, Charles Mehl, assistant executive secretary of the Associated General Contractors of America, reported last month. A special AGC committee formed last spring to work for adequate supplies has been given that hope by steel industry representatives. By next October, however, structural steel fabricators will have an entire year's backlog of orders to erase as well as a greatly increased current demand.

A number of internal changes in AGC, one of the large national contractors' associations, were announced last month. Herbert "Doc" Foreman, managing director and construction industry spokesman for many years, has retired. Arch N. Carter, "Mr. Highways" for the AGC, has resigned his post as manager of the contractors' Highway Division to become a partner in a Minnesota consulting firm. One of the most popular men in the industry, Mr. Carter represented AGC on numerous inter-industry groups. He has been succeeded by James Sprouse, formerly manager of AGC's Heavy Construction Division. Frank Twiss, of the International Road Federation, has joined AGC to act as representative of the association on a number of key industry committees and as specialist in highway matters.

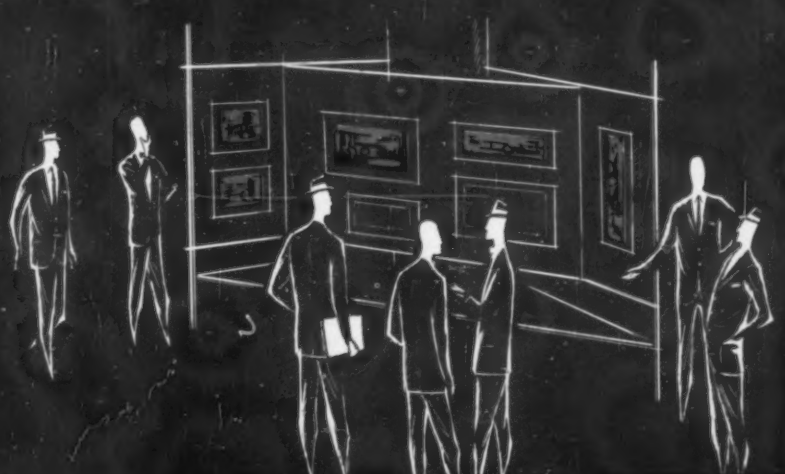
Road Show Highlights:

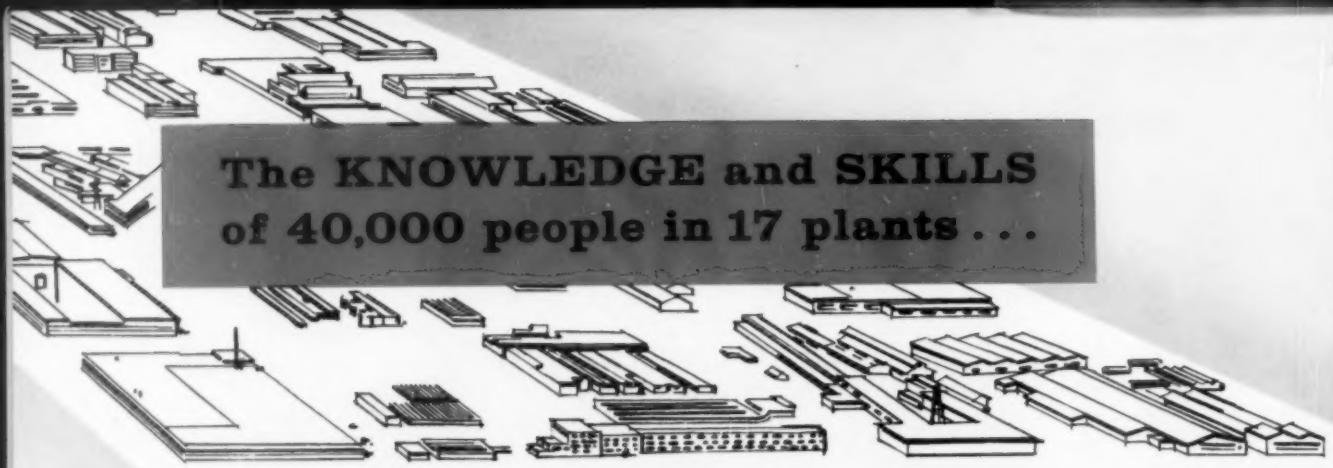
See how

ALLIS-CHALMERS

Engineering-in-Action

can help you meet the challenge of the big road-building years ahead!

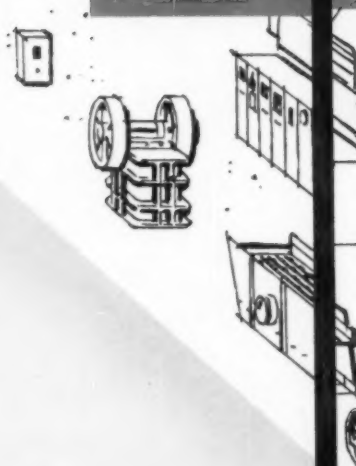




The KNOWLEDGE and SKILLS of 40,000 people in 17 plants . . .

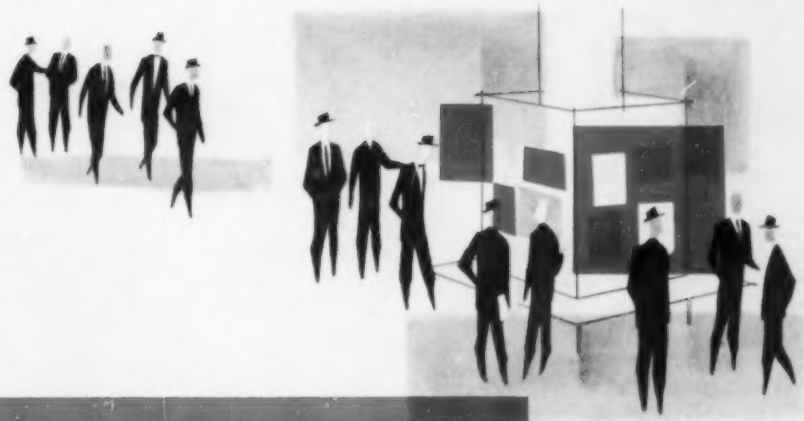
. . . the Construction Industry's RESEARCH • ENGINEERING

. . . the 1,600



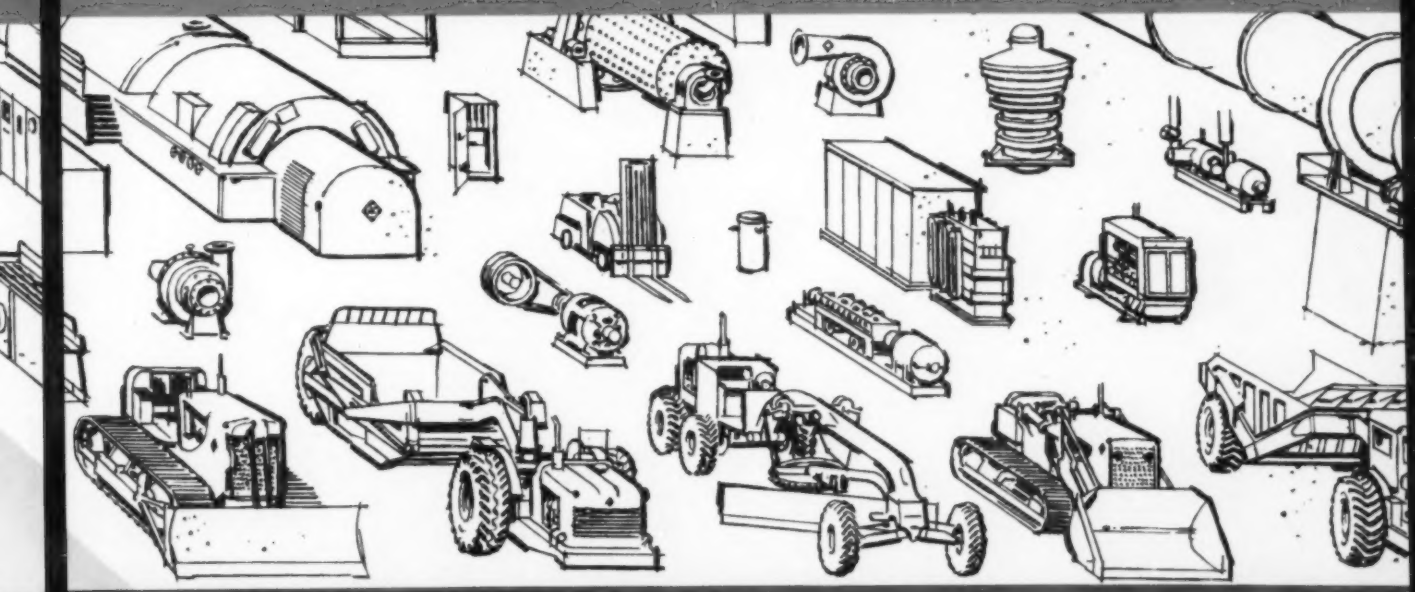
Engineering·in·Action

give YOU a complete line of for



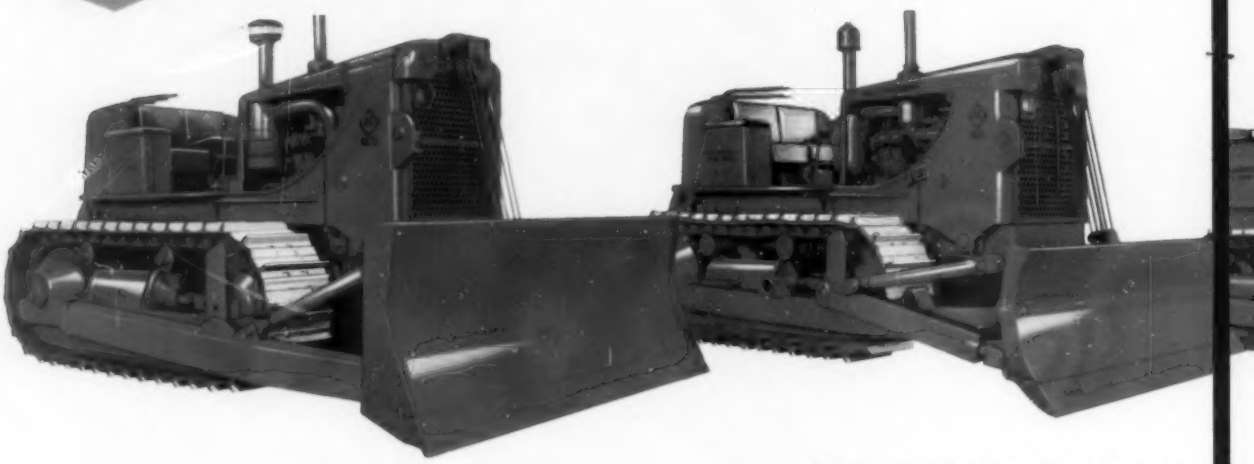
broadest facilities in
MANUFACTURING • DISTRIBUTION

EXPERIENCE gained in building more than basic products for the world's major industries . . .



advanced-design construction machinery . . . production and profit on the job!

Engineering-in-Action FOR



HD-21
204 net engine hp
(torque converter drive)
2 forward speeds to 7.5 mph
1 reverse speed to 5.5 mph
53,400 lb (approx. as shown)

HD-16
150 net engine hp (torque converter drive)
3 forward speeds to 7.2 mph
2 reverse speeds to 5.5 mph
141 belt hp (standard transmission)
6 forward speeds to 5.8 mph
3 reverse speeds to 4.5 mph
38,200 lb (approx. as shown)

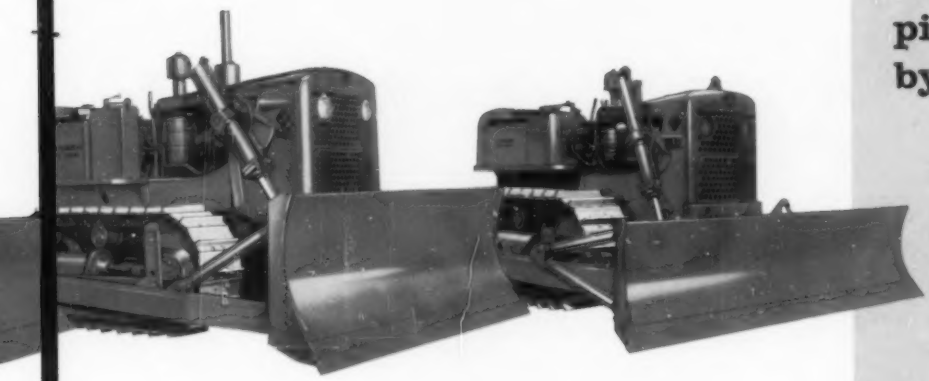
4-cu-yd HD-21G
204 net engine hp
(torque converter drive)
13-ft, 4-in. dump height
66,500 lb

3-cu-yd HD-16G
150 net engine hp
(torque converter drive)
12-ft, 3-in. dump height
47,800 lb

Model 315
Struck—15 yd
Heaped—20 yd
Cable control
25,850 lb

Model 108
Struck—8.4 yd
Heaped—11 yd
Cable control
15,250 lb

PRODUCTION AND PROFIT ON THE JOB

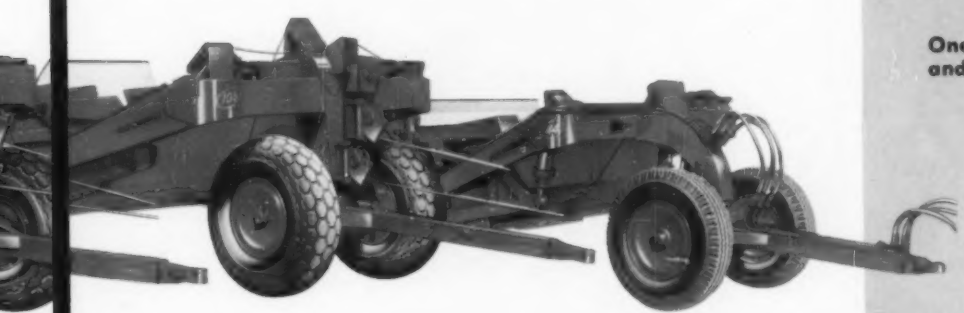


HD-11 94 belt hp
6 forward speeds to 5.7 mph
3 reverse speeds to 4.4 mph
24,600 lb (approx. as shown)

HD-6 63 belt hp
5 forward speeds to 5.5 mph
1 reverse speed to 2.0 mph
15,850 lb (approx. as shown)

2¼-cu-yd HD-11G 111 net engine hp
11-ft, 7-in. dump height
32,000 lb

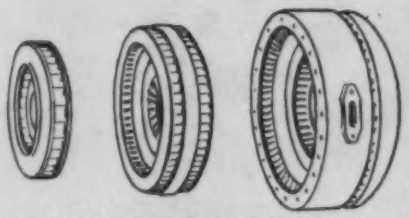
1½-cu-yd HD-6G 72 net engine hp
10-ft dump height
19,600 lb



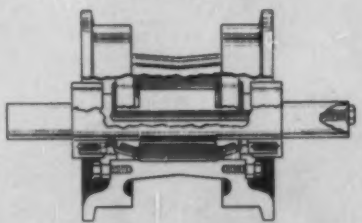
Model 106 Struck—6.1 yd
Heaped—7.5 yd
Cable control
10,300 lb

Model 44 Struck—4 yd
Heaped—4.7 yd
Hydraulic control
6,595 lb

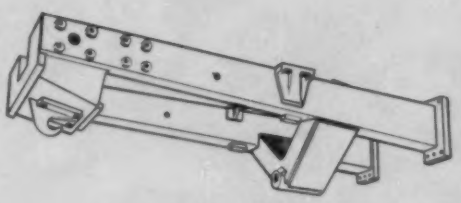
Examples of Engineering in Action ADVANCES pioneered and proved by Allis-Chalmers



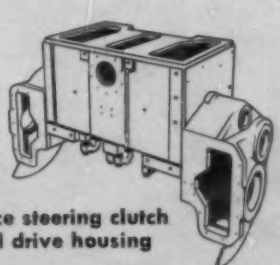
Torque converter drive



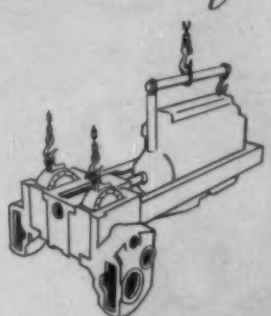
1,000-hour lubrication intervals



All-steel Box-A main frame



One-piece steering clutch and final drive housing



Unit construction

Engineering-in-Action FOR

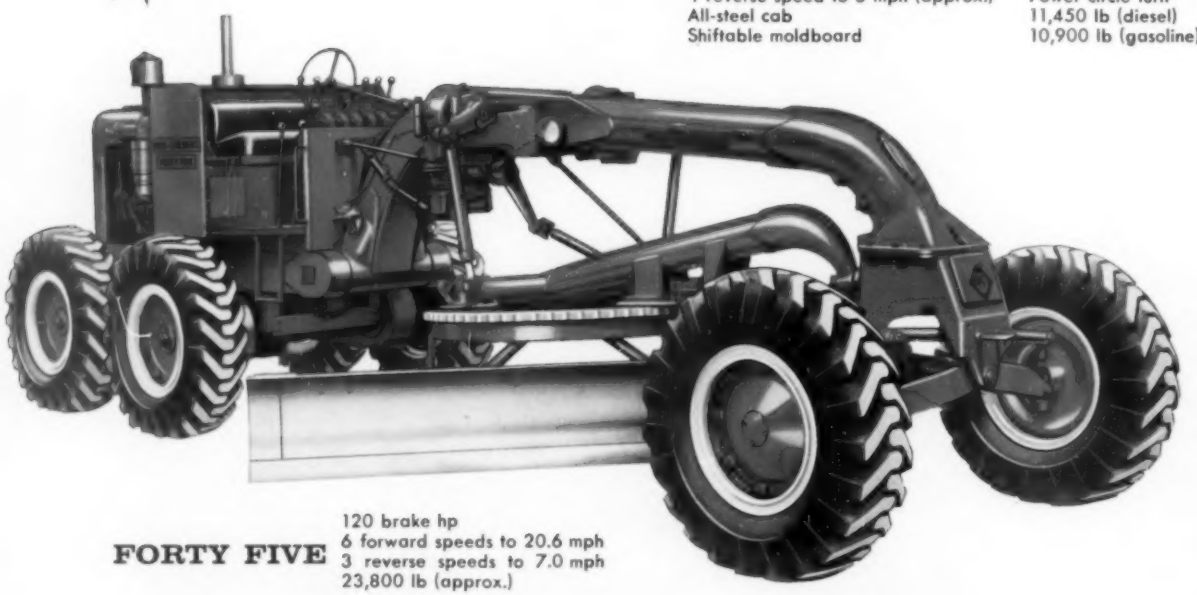
TS-360
280 hp
Struck—15 yd
Heaped—20 yd
Speeds—to 20.0 mph
Weight—49,050 lb
(approx.)

TS-260
200 hp
Struck—11 yd
Heaped—14 yd
Speeds—to 20.0 mph
Weight—39,600 lb
(approx.)

TW-360
Struck—17 yd
Heaped—22 yd
Tons—26
Weight—47,000 lb
(approx.)

Model D Special

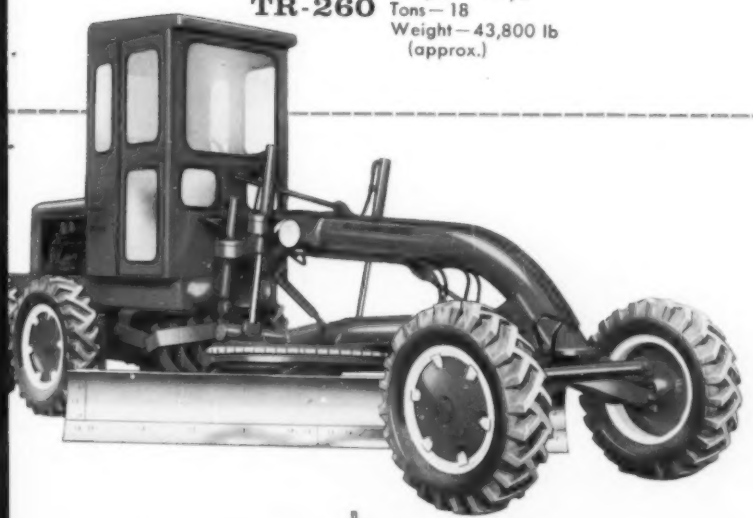
50 brake hp, gasoline or diesel engine
4 forward speeds to 25 mph (approx.)
1 reverse speed to 3 mph (approx.)
All-steel cab
Shiftable moldboard
Hydraulic scarifier
Leaning front wheels
Power circle turn
11,450 lb (diesel)
10,900 lb (gasoline)



FORTY FIVE
120 brake hp
6 forward speeds to 20.6 mph
3 reverse speeds to 7.0 mph
23,800 lb (approx.)

PRODUCTION AND PROFIT ON THE JOB

TR-260
Struck—11 yd
Heaped—15 yd
Tons—18
Weight—43,800 lb
(approx.)

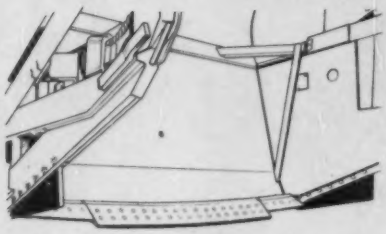


Model D Standard and Rear-End Loader
8,800 lb (gasoline)
9,350 lb (diesel)
⅛-cu-yd bucket—hydraulically controlled
Loader—2,200 lb
(approx.)

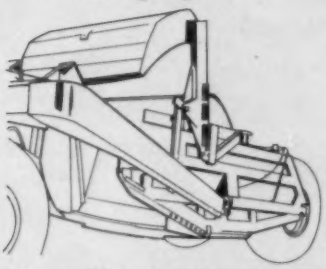
Examples of Engineering in Action

ADVANTAGES

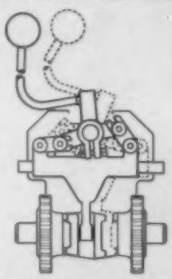
pioneered and proved by Allis-Chalmers



Curved bowl bottom and offset cutting edge

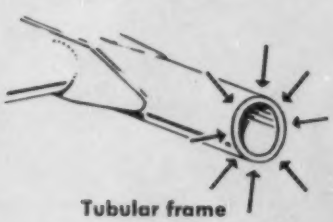


High apron lift and positive ejection



Toggle-type control

ROLL-AWAY moldboard



Tubular frame

Engineering-in-Action

FOR PRODUCTION AND PROFIT ON THE JOB

Power Units

D-153 Diesel
35 max. brake hp @ 1800 rpm

D-230 Diesel
53 max. brake hp @ 1800 rpm

B-125 Gasoline
28 max. brake hp @ 1800 rpm

D-779 Diesel
160 max. brake hp @ 1800 rpm

D-844 Diesel
189 max. brake hp @ 1800 rpm

DS-844 Diesel
243 max. brake hp @ 1800 rpm

W-226 Gasoline
60 max. brake hp @ 1800 rpm

Wheel Tractors

Model IB
22.87 belt hp

Model WD-45
45 belt hp

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Your Allis-Chalmers construction machinery dealer offers you the benefits of factory-trained, well-qualified men to provide fast, expert service on your equipment and keep it working at designed capacity. He stocks only *True Original Parts*, engineered right, manufactured right, to perform right . . . help you take full advantage of the big road-building years ahead.

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

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Printed in U.S.A.

Versatile, power-matched

TRACTORS, ATTACHMENTS — DESIGNED FOR EACH OTHER! Here's the first family of machines in this work range *built to construction standards* with integrated design of both tractors and attachments. Five tractors (34 to 52 hp) with choice of 20 attachments — loaders, hoes, blades, mowers, trenchers, augers, fork lifts, and others — to handle scores of jobs.

WORK BULL MODEL 303 has 42-hp gas or diesel engine. With ⅝-yard loader, it pays off on scores of backfilling, loading and stockpiling jobs. Other front-mounted attachments: Angle dozer, fork lift, utility boom, scarifier, sweeper. Powerful hydraulic backhoe.

LOW-COST, VERSATILE Model 202 Fork Lift loads equipment and machinery, stockpiles building materials, also handles blade or utility bucket. Economical-to-operate 34-hp engine makes it great for utility and cleanup on big spreads . . . ideal for small, scattered, work-and-run jobs.

42-HP DAVIS PIT BULL handles either ⅝ or ⅞-yd buckets. Frequently outperforms bigger, more costly shovel-loaders because of overall advanced design, which includes torque converter and "foot-shift" reversing clutches as standard equipment.

packages!

52-HP WORK BULL MODEL 404 mounts ⅝-yd front-end loader plus powerful hydraulic backhoe. Loader, fork lift and other front-end attachments operate off same hydraulic arms. As with all Work Bulls, attachment switches take only 5 to 15 minutes.

BUILD BETTER ROADS TODAY · FOR A GREATER AMERICA · See you at the ROAD SHOW CHICAGO Jan. 28-Feb. 2, 1957

New M-H-F Work Bulls pay off . . . as primary equipment . . . as backup machines . . . as utility or cleanup tools

Versatile Work Bulls — with a choice of 20 easily interchangeable, *switch-in-a-smoke-break* attachments — offer a great two-fold opportunity to increase earnings. You put more work on a paying power basis. And you get more effective application of your present crawler or rubber-tired digging, loading and maintenance equipment.

Pay off on every project

On small, scattered assignments, Work Bulls earn a handsome profit . . . mechanize hand labor . . . hustle over-the-road or cross-country from site to site.

On medium-sized layouts, Work Bulls team with larger, single-purpose equipment . . . keep equipment costs in line with the job and simplify equipment scheduling.

On big spreads, Work Bulls take over maintenance and cleanup duties . . . allow scrapers, dozers, shovels and other big rigs to concentrate on work they can handle most profitably.

See how a relatively minor investment can *pay off in big profits.* Write for free catalog and the name of your retail distributor.

One source, one responsibility for sales and service on both tractors and attachments

M-H-F

WORK BULLS

DIVISION OF MASSEY-HARRIS-FERGUSON, INC.

19-A Quality Avenue

Racine, Wisconsin

. . . for more details circle 275, page 16

THIS TOO, IS JOB INSURANCE!

Winch equipped CAT D8 tractor assists scraper through heavy mud.

BUILD BETTER ROADS TODAY · FOR A GREATER AMERICA · See you at the ROAD SHOW CHICAGO Jan. 28-Feb. 2, 1957 AMERICAN ROAD BUILDERS ASSOCIATION

See Hyster Equipment at the Caterpillar Tractor Co. Display

A HYSTER TOWING WINCH ON MY CATERPILLAR-BUILT TRACTOR PROTECTS ME AGAINST... LOSS OF { TIME / PRODUCTION / PROFITS

• Naturally, I insure myself against all possible losses on all of my contracts. But I consider the price of my Hyster Winch the cheapest insurance premium I've ever paid.

Here's Why: Profits slide down fast when bogged-down equipment causes lost time and production. I cut this loss to a minimum by keeping the job moving with the all-purpose pulling power my Winch provides. At the same time I am reducing wear and tear on my tractor because the Winch is designed specifically for heavy pulls greater than the tractor drawbar pull.

Thousands of tractor owners have found that the Job Insurance provided by *Winch-pulling power* pays big dividends. For all the facts, call your Caterpillar Dealer (he is also your Hyster Dealer) or write Hyster Company, 2995 N. E. Clackamas St., Portland, Oregon, or 1895 N. Adams St., Peoria, Illinois.

D8D TOWING WINCH

All Hyster Winches are designed for "balanced, matched performance" with Caterpillar-built Tractors. . . . *When you operate a Caterpillar-Hyster "Machine Package" you know you are getting your money's worth.*

Caterpillar and Cat are registered trademarks of the Caterpillar Tractor Co.

HYSTER COMPANY

A full line of Winches for Caterpillar-Built Tractors

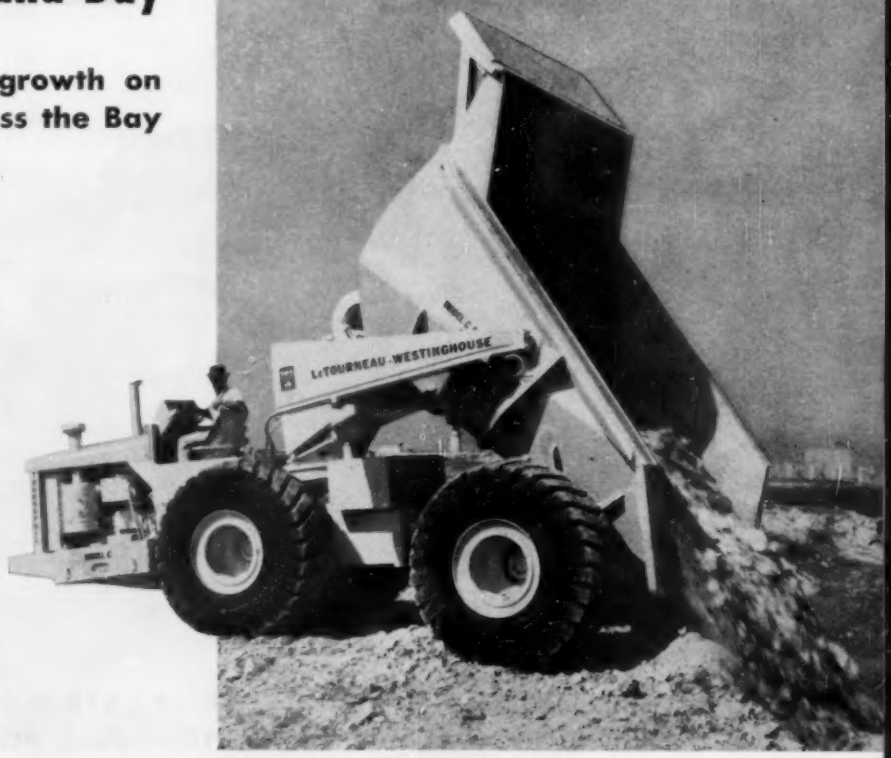
HYSTER

. . . for more details circle 316, page 16

Haul 15,000,000 cu. yds. of rock to build tunnel under Havana Bay

Predict 80% of city growth on newly-opened land across the Bay

Finance, construction and operation of the $28,500,000 tunnel under the Bay of Havana is directed by a private corporation, Cia., de Fomento del Tunel de la Habana. Tunnel is being laid deep enough to allow the largest ships to float over it without difficulty as they enter the harbor. Tunnel will connect with newly-constructed major highways leading to Cuba's five eastern provinces. According to estimates made by a reliable firm of traffic analysts, more than 5,800,000 vehicles will pass through the great clover-shaped eastern gateway of the tunnel during the first year. And the traffic flow is expected to increase annually in the projected future!



Tournapull dumps a load of rocky spoil blasted from the tunnel. Across the Bay can be seen the tall commercial buildings of downtown Havana.

Since the days when pirates roamed the Caribbean, Havana Bay has effectively divided northern Cuba into east and west. Over the years, Havana has become more and more congested, while the extensive lands just across the narrow bay inlet have remained undeveloped, due to their inaccessibility.

To open this vital eastern area to the growing city's needs, a 4-lane auto tunnel is being built under the harbor entrance channel. It will cut automobile travel time between the new suburb east of the city and the downtown section of the capital, to *only two minutes*. City officials predict that, with the new access highway, the area east of the harbor will absorb 80% of the city's growth.

Move vast quantities of rock

To dig this important 30-acre tunnel under the Bay, the contracting firm Societe des Grands Travaux de Marseille must move 15,000,000 cubic yards of blasted rock. Outstanding in the fleet moving this material are six Model C Tournapull Rear-Dumps, of 22-ton capacity.

Tournapull Rear-Dump is shovel-loaded with 15 cu. yds. of blasted rock, excavated for the eastern approach to the "Tunnel of Havana". Tournapulls traveled around the Bay from the dock in the city, to this work site at tunnel entrance, under their own power. The 8-mile trip took about an hour.

Traveling typical .6-mile cycles, each of these Rear-Dumps hauls out 15 cubic yards of blasted rock from the tunnel site every 16 minutes.

Haul up 12% grades, across rock, through mud

These 208 hp Rear-Dumps must constantly travel over sharp, uneven, newly-blasted rocky footing. Haul is up and down grades ranging to 12%. Rainy weather presents a further obstacle to fast hauling. Rain water collects in scattered pockets of earth, and in the rock floor of the tunnel approaches. This water forms slick, slippery patches of mud that slow down the haulers. But despite the rocky, hilly, sometimes slippery route, the earthmoving fleet on tunnel excavation has moved 60% of the rock in about 50% of the scheduled time.

Investigate Tournapull advantages

On the biggest, most demanding earthmoving projects all over the world, you will find modern LeTourneau-Westinghouse equipment at work. The next time you have earth to move, it will pay you to investigate the advantages offered by heavy-duty Tournapull Rear-Dumps. There are three sizes to fit your requirements with 11, 22- and 35-ton capacities. Write us for complete information.

Tournapull—Trademark Reg.U.S.Pat.Off. CR-1172-H-b

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

. . . for more details circle 248, page 16

WHERE QUALITY IS A HABIT

Jaeger's all-new Self-widening Finisher will be there at the Road Show

. . . for more details circle 223, page 16

LIMA

Announcing

TWO NEW LIMAS

Here are two powerful additions to the LIMA line of power shovels, cranes, draglines and pullshovels. The Types 1250 and the 1250-SC are the carefully engineered answers to the popular demand for a high capacity shovel and a crane that will hoist concrete and steel to the top of a 24-story building.

As a standard shovel, the 1250 is equipped with a 28-foot boom, 22-foot handle and three cubic yard dipper; as a high lift shovel, with a 45-foot boom, 32-foot handle and 2½ cubic yard dipper.

The 1250-SC is designed for sky-scraping duty, a rugged machine that swings a 200-foot boom and 50-foot jib with pin point precision.

These air operated rigs are in the big-time producer class yet their design permits knock down for haulage into units of less than 60,000 pounds. Side frames and counterweight segments are removable and the gantry can be folded to a height of 12 feet, 7¼ inches for job to job transportation.

Two truck bases are available—standard and widespread as well as two lengths of crawler assemblies (standard and long). The bases are one-piece carbon steel castings, bored and bushed for through axles.

The 1250 and 1250-SC are available with diesel or electric power and with or without torque converter drive.

Get complete details on this profit-making machine from your nearby LIMA distributor, or write to Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

BRIEF SPECIFICATIONS	Shovel	Dragline	1250 Crane	1250-SC Crane
Rating	3 yds.	.....	85 tons	100 tons
Crawler length	16′-5″	20′-7½″	20′-7½″	20′-7½″
Crawler width (32-in. treads)	13′-5″	13′-5″	13′-5″	16′-0″
Crawler width (42-in. treads)	14′-3″	14′-3″	14′-3″	16′-10″
Cab width	10′-6″	10′-6″	10′-6″	10′-6″
Cab height	12′-7¼″	12′-9¼″	12′-9¼″	12′-9¼″
Rear end tail swing	15′-8″	15′-8″ & 17′-1″	15′-8″ & 17′-1″	17′-1″
Gantry height (folded)	14′-1¼″	14′-3¼″	14′-3¼″	14′-3¼″
Gantry height (working)	14′-1¼″	23′-10″	22′-1″	22′-1″ & 28′-9″
Boom length	28′ & 45′	110′	60′ to 150′	100′ to 200′
Handle length	22′-9½″ & 32′-9¼″	.....	.....	.....
Jib length	.....	.....	20′ to 50′	30′ to 50′
Boom length, including jib	.....	.....	200′	250′

COMPARE LIMA QUALITY . . . features and available equipment:

- *Independent propel*
- *Load-lowering device*
- *Extra high-speed hoist attachment*
- *Third drum*
- *Power-reversing hoist drum*
- *Heavy-duty and special lightweight booms*
- *Telescopic boom stop with automatic shutoff*
- *Steering controlled by gear-type jaw clutches*
- *Electric lighting equipment*
- *Torque converter drive*
- *Anti-friction bearings at all important bearing points*

QUALITY CONSTRUCTION

One-piece carbon steel rotating truck base . . . fabricated steel machinery frames . . . machine-cut gears . . . heat-treated steel ground shafting . . . large diameter clutches and brakes.

THE LIMA LINE INCLUDES:

SHOVELS	CRANES	DRAGLINES	PULLSHOVELS
to 6 cu. yds.	to 110 tons	variable	½ to 2½ cu. yds.

Smaller machines available on rubber

SEE THE NEW LIMA 1250 AT THE ROAD SHOW, BOOTH 506 ARENA IN CHICAGO, JAN. 28—FEB. 2.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA SHOVELS · CRANES DRAGLINES · PULLSHOVELS

BALDWIN BLH LIMA-HAMILTON

BALDWIN-LIMA-HAMILTON
Construction Equipment Division — LIMA WORKS

OTHER DIVISIONS: Austin-Western • Eddystone • Electronics & Instrumentation
Hamilton • Loewy-Hydropress • Madsen • Pelton • Standard Steel Works

TYPES 1250 *and* 1250-SC

3 CU. YD. HEAVY-DUTY SHOVEL

HIGH-CAPACITY DRAGLINE

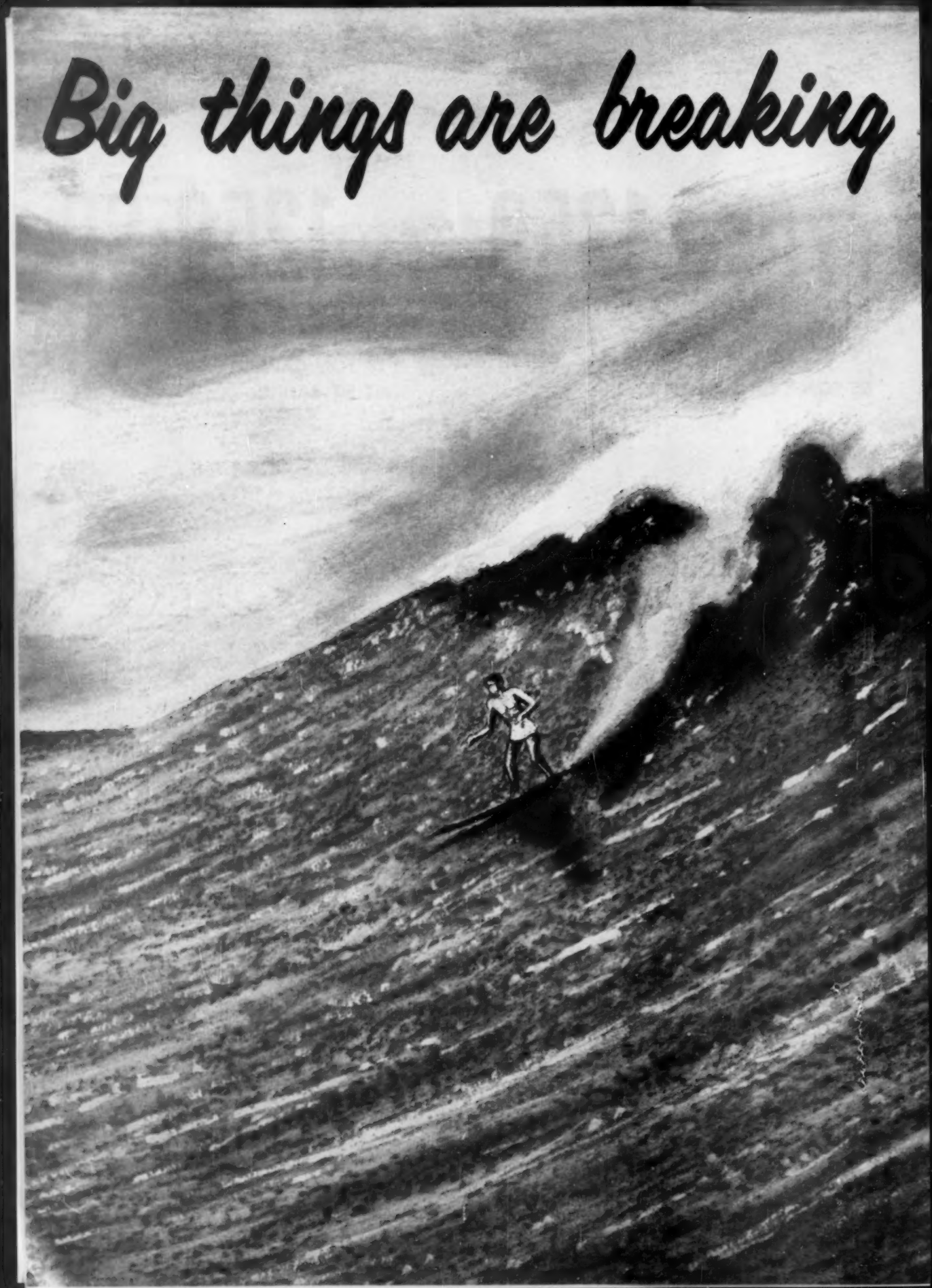
85 TON CRANE AT 13′ RADIUS

100 TON CAPACITY ON 60′ BOOM AT 13′ RADIUS

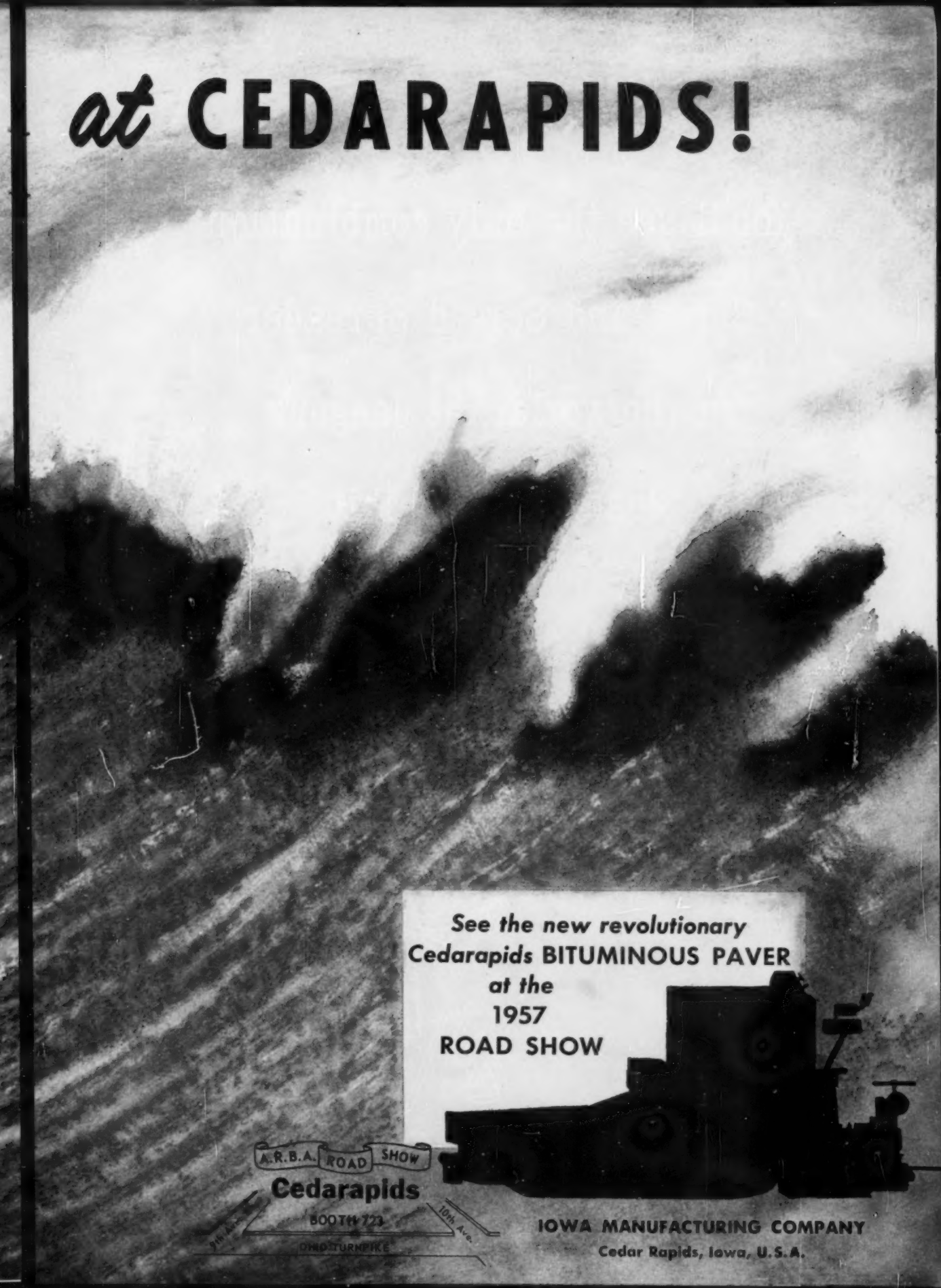
18 TON CAPACITY ON 200′ BOOM AT 50′ RADIUS

. . . for more details circle 283, page 16

Big things are breaking



at CEDARAPIDS!



See the new revolutionary
***Cedarapids* BITUMINOUS PAVER**
at the
1957
ROAD SHOW

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa, U.S.A.

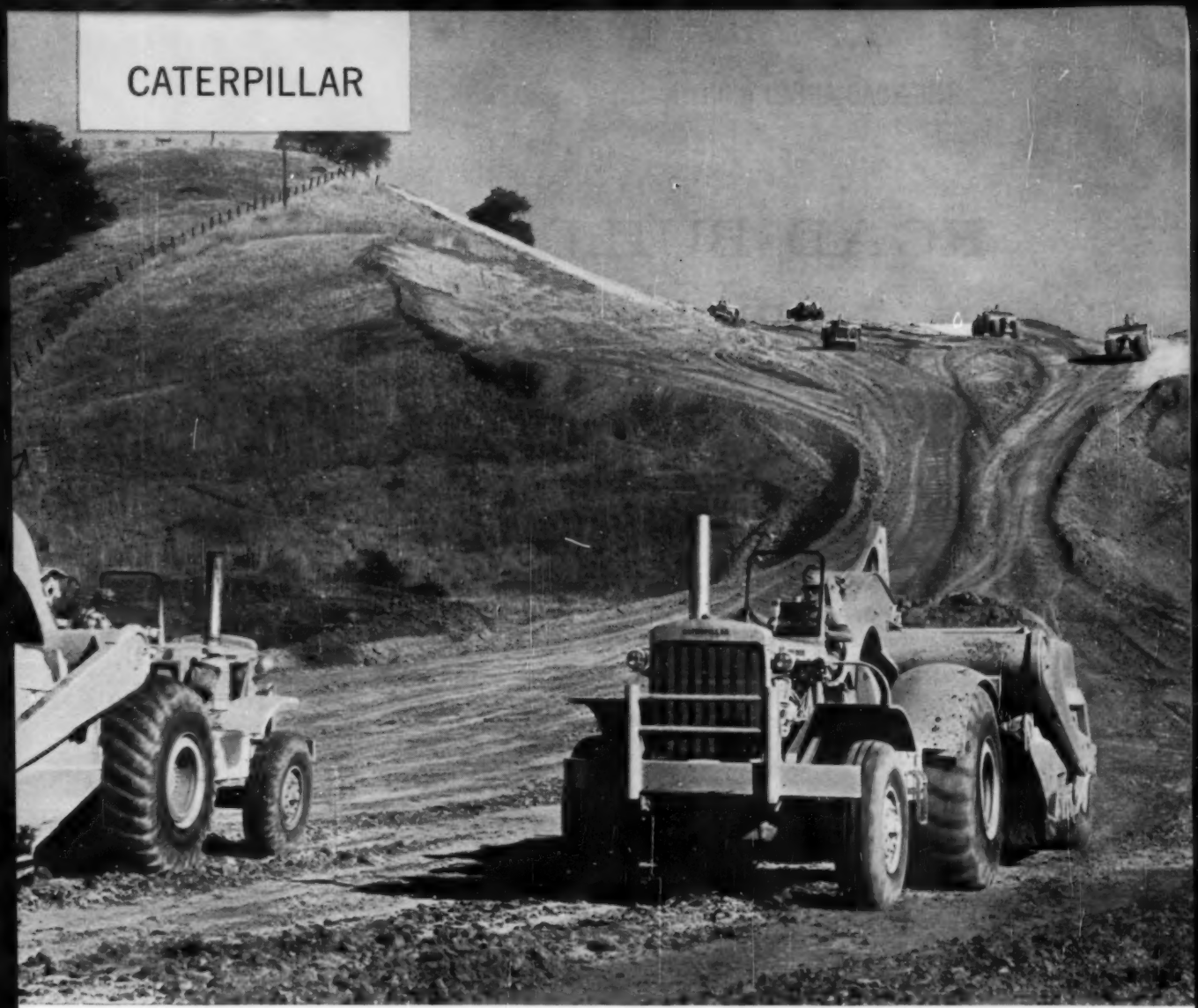
You'll see the only combination

Screw and Screed Spreader

in the world...at Jaeger's

Road Show exhibit

. . . for more details circle 233, page 16



THE ROAD AHEAD

America's new highway program is a 50-billion-dollar challenge to the nation's road builders. Success of the greatest building project ever conceived by man rests with them alone

America has handed the new Federal-aid highway building program to the nation's road builders with complete confidence.

In the next 13 years, the U.S.A. will spend 50 billion dollars building Federal-aid roads alone. From the program will rise a magnificent 41,000-mile system of Interstate Freeways. It totals up to the greatest building project in history.

Only this nation could have the vision for such a program. For only America has the need for it . . . and the resources to see it through to completion. And only America—unawed by bigness—could start such a program without a doubt of its success . . . a magnificent tribute to the nation's road builders.

But make no mistake about it. This is a 50-billion-dollar challenge. It will take co-ordination, co-operation, and the combined experience of the nation's contractors, engineers, Federal and State road officials, bankers, material producers and equipment manufacturers. They start with the nation's confidence. Will they be able to hold it on the long road ahead? The next two pages will give you a clue.

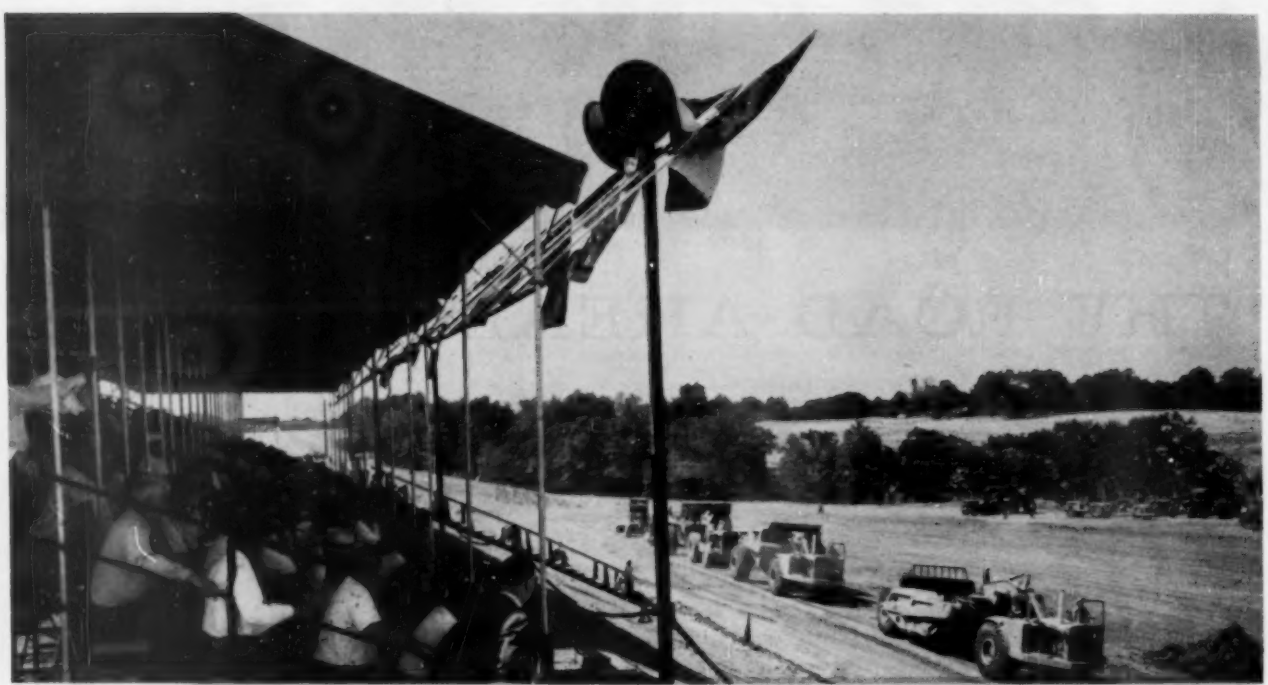
CONTINUED

ROAD BUILDERS RISE TO THE CHALLENGE BY WORKING TOGETHER AS NEVER BEFORE

The key to America's fabulous road-building program is co-operation. The men who must make it work are a diversified group—bankers, engineers, contractors, government officials, materials producers, equipment manufacturers. But they are united today by *one goal* and are setting an example of industry co-operation rarely equaled. Here are some examples of how an equipment manufacturer is co-ordinating its activities with all other groups.

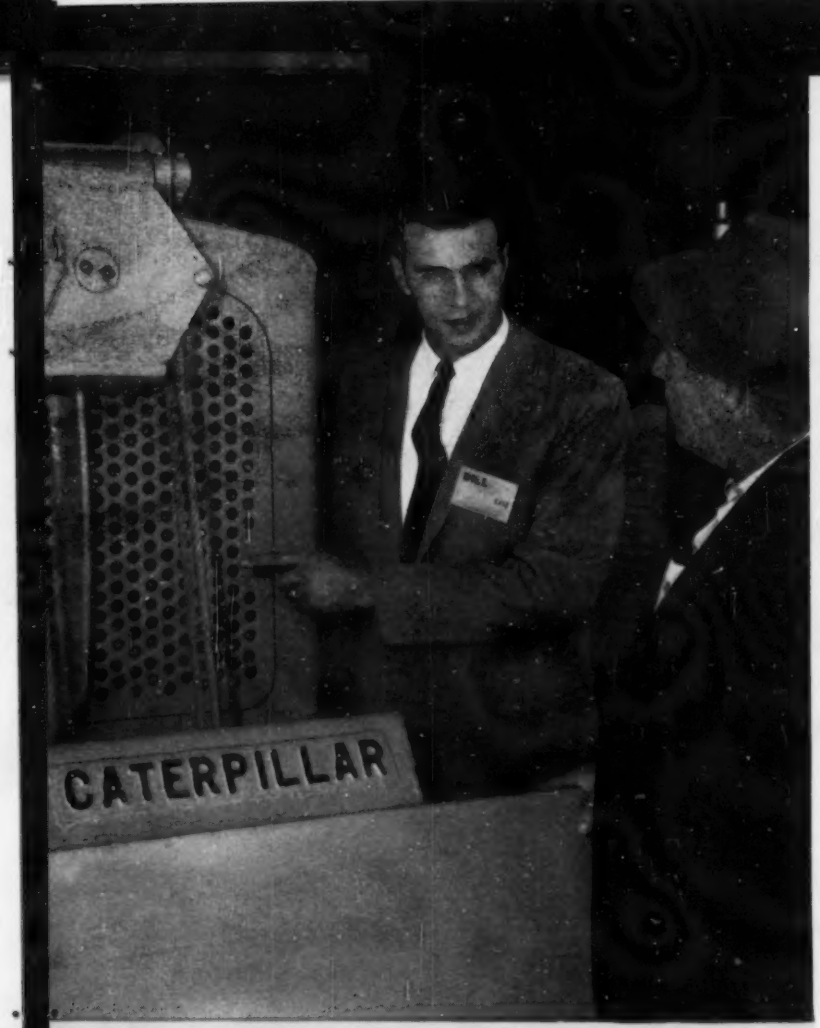
Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.



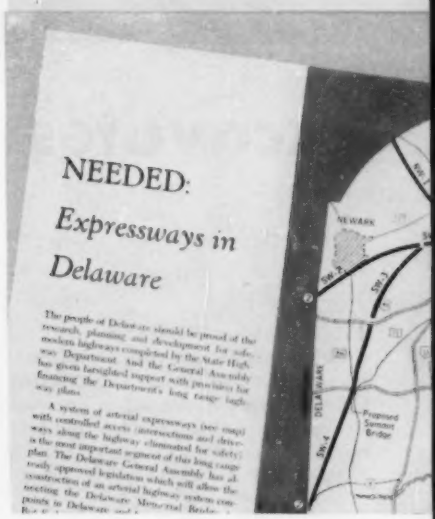
BANKERS AND EQUIPMENT MANUFACTURERS. Some 180 bankers from every sector of the U.S.A. view the latest earthmoving equipment at the world-famous Caterpillar proving ground in Peoria. A two-day program gives them a close-up of new and improved CAT* equipment—like the giant D9 and the new DW21 with its high-capacity LOWBOWL Scraper—which they finance for contractors. A show like this bolsters confidence—makes credit easier.

Adams 660, push-loading a Model D Tourna-



CONTRACTORS, GOVERNMENT OFFICIALS, MATERIALS PRODUCERS AND EQUIPMENT MANUFACTURERS. The 1957 Road Show in Chicago this month will demonstrate to contractors, government officials and materials producers that the equipment is ready for the job ahead. Caterpillar's exhibit will feature the new road program in detail and will spotlight the machines on which contractors will depend to accomplish the job.

STATE OFFICIALS AND EQUIPMENT MANUFACTURERS. This Caterpillar leaflet helped road officials in Delaware get important limited access legislation approved. Caterpillar first featured Delaware in a national advertisement, then local Caterpillar Dealers sent reprints like this to legislators and other interested persons in the state explaining the need for limited access legislation. Bill passed soon after.


NEEDED:

Expressways in Delaware

The people of Delaware should be proud of the research, planning and development for modern highways completed by the State Highway Department. And the General Assembly has given farsighted support with provisions for financing the Department's long range highway plans.

A system of arterial expressways (see map) with controlled access (intersections and driveways along the highway eliminated for safety) is the most important segment of this long range plan. The Delaware General Assembly has already approved legislation which will allow the construction of an arterial highway system connecting the Delaware Memorial Bridge

ENGINEERS AND EQUIPMENT MANUFACTURERS. Exhaustive on-the-job tests are made on newly designed equipment to help engineers figure capacity, speed of production. Engineers base their estimates and contracts on the known production capabilities of machines—they depend on those machines to perform with minimum down time. Here the Caterpillar DW21 Tractor with No. 470 LOWBOWL Scraper helps meet the engineers' challenge on the Florida Turnpike.

. . . for more details circle 302, page 16

Adams 660, push-loading a Model D Tournapull, kept firm footing in this heavy gumbo. Special push-plate was made by contractor.

Excavates and sub-grades streets *for Wichita subdivision*

At Woodlawn Village, a new residential subdivision east of Wichita, Kansas, Ritchie Bros. Construction Co. of Wichita contracted to excavate streets in a section of this 160-acre residential development by Wheeler-Kelly-Hagny Realty Co.

The Ritchies used 3 self-propelled scrapers and an Adams 660 grader to handle this street excavation work. The "660", with its wide range of speeds — forward and reverse — got around fast to push-load the 3 scrapers and level sub-grade for subsequent paving. Machines worked in heavy gumbo most of the time.

Foreman J. H. Boaz said this about the grader's performance:

"I have had over 20 years' experience in all types of construction, both heavy and light. The 660 is the best all-around grader I have seen."

Quick back-up (to 13.7 mph) saves valuable time on shuttle grading. Operator has clear view of work, wide range of speeds to get more work done in less time, with Adams 660.

Operator Dean Wolf used 2nd gear, 3.3 mph, to push-load. "It seems to me," Wolf stated, "that the Adams is the best grader in use today. The machine outperforms any I have used, and visibility of the blade is good."

Wide range of speeds gives Adams the advantage in working any kind of material. Heavy Adams graders have 8 forward speeds, to 26 mph. With optional "creeper" gears, 3 extra-low speeds, from 0.23 to 1.82 mph, may be added. These low speeds move heavier loads, handle rocky material with greater speed and safety, insure more accurate blade control in fine finishing when the main job is done.

The "660" has four reverse speeds, to 13.7 miles per hour, which save time on shuttle-grading in narrow spaces between houses and on short passes, where quick backing enables operator to get more work done in less time. Fast reverse speed is valuable also in quick positioning to push-load scrapers, saves time for both units.

Engine develops power-to-spare

Big 150 hp diesel engine of Adams 660 starts easily in any temperature, develops power-to-spare, with lugging ability to move heavy loads in tough going. Engines in Adams heavy graders are rubber-mounted to reduce annoying vibration and promote greater efficiency of operator, with less maintenance on machine.

Heavy, box-construction, one-piece frame of grader resists shocks and stresses. Constant-mesh transmission makes gear-changing easy, lengthens life of gears.

Stops are safe and sure with double-action hydraulic brakes. Pressure on brake pedal stops transmission as well as drive wheels. Hand brake is used for parking.

Use performance yardstick

Buy your next grader on the basis of performance. Let us show you a modern grader at work, help you select the size best suited to your type of work operation.

A size ADAMS for every need

Model 660—150 hp diesel, 27,730 lbs.
Model 550—123 hp diesel, 23,500 lbs.
Model 440—104 hp diesel, 21,500 lbs.
Model 330— 80 hp diesel, 20,500 lbs.
Model 220— 60 hp diesel, 14,865 lbs.

TraveLoader — high-speed, heavy-duty, self-propelled, belt-type loader for all loose materials. 55 hp gasoline or 60 hp diesel engine. Wt. 16,800 lbs.

Tournapull—Trademark Reg. U.S. Pat. Off. AG-26-8-b

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS
A Subsidiary of Westinghouse Air Brake Company

WHERE QUALITY IS A HABIT

. . . for more details circle 249, page 16

TEAR OUT THIS PAGE...TAKE IT WITH YOU TO THE CHICAGO ROAD SHOW

BIG NEWS at the biq ROAD SHOW!

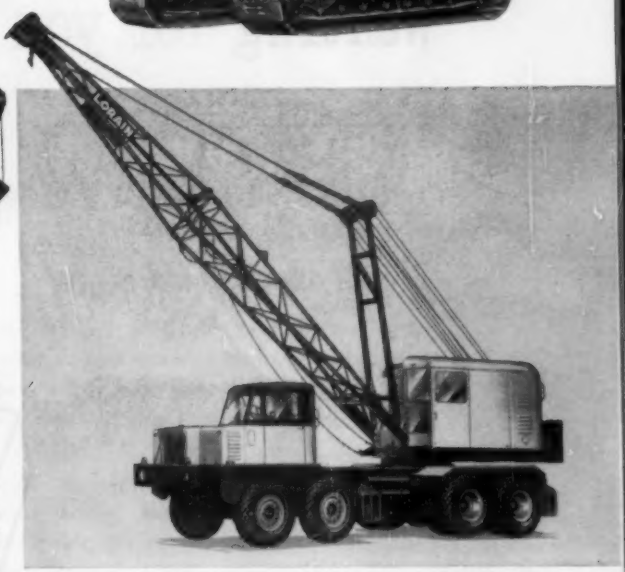
Take a good LOOK at the new LOOK in LORAIN

SEE THE NEW LORAIN-85A

Don't miss the "new look" in Lorains • New, streamlined cab on the big 2½-yd. Lorain-85A features greater comfort, convenience • Greater operating ease with 2-lever, "Joy Stick-Air Ease" power controls • Less maintenance with new "Shear-Ball" turntable mounting • 2 sizes of crawlers available with 4 crane capacities • Crane booms to 200 ft., plus tip—a boom for every job.

SEE THE NEW LORAIN SP-107

A new construction tool • Close-coupled, 7-ton Self-Propelled crane, shovel, clamshell, dragline or hoe • No outriggers needed for full capacity • 4-wheel drive and 4-wheel steer enable it to move "sideways" • Top speed of 15 m.p.h. • Equally at home on-or-off the highways.



SEE THE NEW LORAIN MC-530W

Lorain's newest Moto-Crane • A big 35-ton crane that can roll on rubber over the highways • "Shear-Ball" turntable mounting • New, longer, heavier carriers as "6 x 4" and "6 x 6" models, plus the new 4-axle "8 x 4" mounting • New, square-tubular-chord boom — up to 170 ft. in length.

SEE THE NEW LORAIN-26

Big, extra heavy-duty ¾-yd. shovel-crane • Features easier operation with 2-lever "Joy Stick-Hydra-Ease" power controls • Improved performance with Torque Converter power take-off (available) • More precise boom control with new, internal gear boom hoist • Longer life with new, bigger clutches.

Booth 503 is bursting with NEW IDEAS for road builders!

THE NEW LORAIN®

THE THEW SHOVEL CO., LORAIN, OHIO, U.S.A.

Not just one but two great

new Jaeger Aggregate Spreaders

to 16′ width, to 16″ thickness

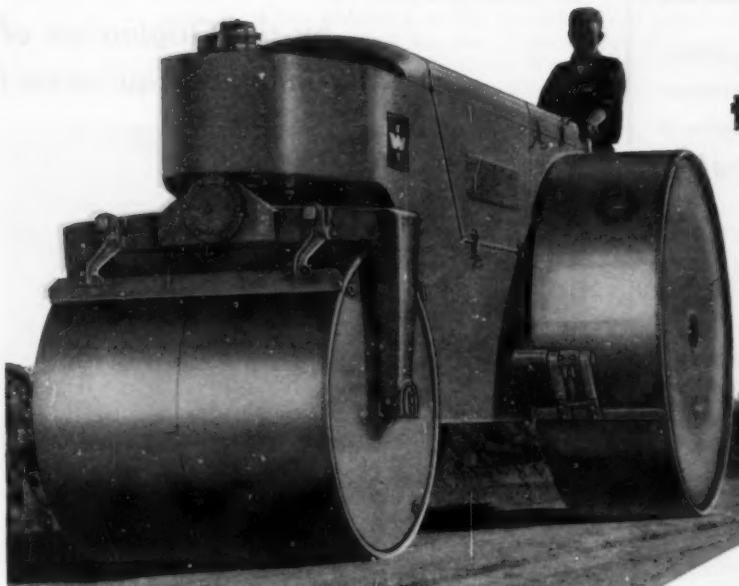
waiting for you at the Road Show

. . . for more details circle 233, page 16

"all new MODERN design"

torque converter

2-speed transmission



HUBER WARCO

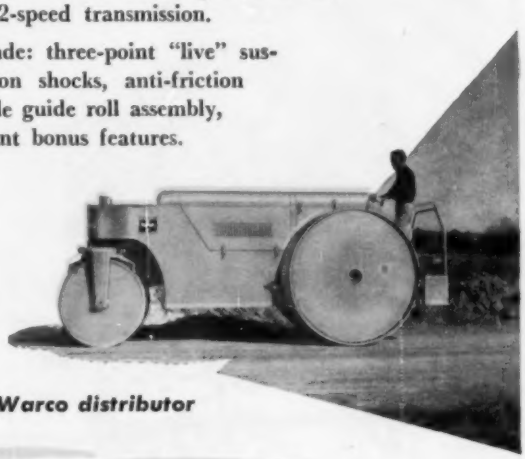
General Purpose • Finishing or Variable Weight

Huber-Warco's newly-designed 3-wheel roller is a powerful, rugged machine built for economy, performance and durability. Greater roller efficiency is achieved by the use of a torque converter, tail-shaft governor and 2-speed transmission.

Other important features include: three-point "live" suspension of the sub-frame to cushion shocks, anti-friction bearings throughout, completely adjustable guide roll assembly, dual braking systems, and many other important bonus features.

Huber-Warco 3-wheel roller can be supplied with variable weight rolls, or with cast iron rolls, in various sizes, for general purpose or finishing work.

See your Huber-Warco distributor for complete details. The Huber-Warco 3-wheel roller is the most modern, dependable roller you can buy.



For a demonstration—see your nearest Huber-Warco distributor

HUBER WARCO

Come see us...

1957 ROAD SHOW—BOOTH 714

On display—Motor Graders • Road Rollers • Maintainers

HUBER-WARCO CO., MARION, OHIO

. . . for more details circle 256, page 16

THE COMPLETE, LOW-COST PLANT THAT PULVERIZES BLENDS AND MIXES

SPEED MIXER

The answer to more economical and speedier construction and reclamation of farm-to-market and access roads, highways, highway shoulders, streets, airports and parking lots!

The husky, moderately-priced Speed Mixer incorporates the preferred high-pressure by-pass binder injection system of the big Pettibone Wood mix-in-place equipment. Note the outstanding features!

EXCLUSIVE FEATURES—One engine for all power; binder flow controlled by high-pressure by-pass system (no need for separate pump engine); positive dual-chain rotor drive, assuring uniform mix; fewer moving parts on clear, heavy-duty rotor; only 30 tines (heavy-duty); simplest design.

The Only

OF MIX-IN-PLACE

...by the Originators of Mix-in-Place Equipment!

MODEL 36-S ROADMIXER—Self-propelled, 36" pugmill, up to 150 tons per hour, discharges uniformly mixed windrows up to 4 cu. ft., one man operated.

MODEL 54-A ROADMIXER—Tractor drawn and powered, 54" pugmill, up to 350 tons per hour for asphalt and up to 550 tons per hour for soil-cement, discharges windrows up to 10 cu. ft. It's the ideal big-capacity mixer when tractor-power is available.

SEE THE PETTIBONE WOOD EQUIPMENT AT THE ROAD SHOW—BOOTH 813

Complete Line

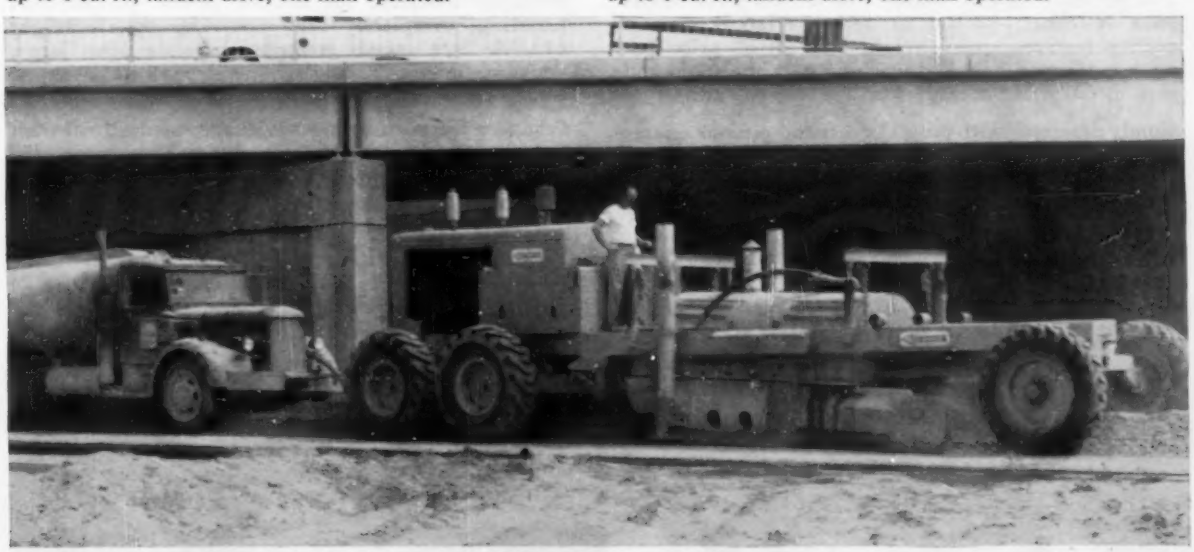
ROADBUILDING EQUIPMENT

Internationally recognized as the most effective, most thorough and fastest in-place mixing method ever devised, the Pettibone Wood system is now available in five powerful Roadmixer and three Speed Mixer models. For over 25 years, roadbuilding engineers have depended upon Pettibone Wood equipment to satisfy the need for lower-cost, better-quality and longer-lasting highways. Used for (1) Construction of bases and subgrades (2) Surfacing of highways and (3) Reuse of reclaimed and pulverized asphaltic surfaces, there's a Pettibone Wood mixer for every job, for every budget.

Write for literature describing how you can build better roads at lower cost with Pettibone Wood equipment.

MODEL 42-S ROADMIXER—Self-propelled, 42″ pugmill, up to 250 tons per hour, discharges uniformly mixed windrows up to 6 cu. ft., tandem drive, one man operated.

MODEL 48-S ROADMIXER—Self-propelled, 48″ pugmill, up to 300 tons per hour, discharges uniformly mixed windrows up to 8 cu. ft., tandem drive, one man operated.



MODEL 54-S ROADMIXER—World's largest self-propelled mixer, 54″ pugmill, up to 350 tons per hour for asphalt and up to 550 tons per hour for soil-cement, discharges windrows up to 10 cu. ft., tandem drive, one man operated. No other in-place mixing machine equals the power of this efficient giant. It's Pettibone Wood's answer to bigger-capacity production for the accelerated highway program!

PETTIBONE WOOD MFG. CO.

6900 Tujunga Avenue, P.O. Box 620, STanley 7-3281
North Hollywood, California

Subsidiary of PETTIBONE MULLIKEN CORP., CHICAGO 51, ILLINOIS

. . . for more details circle 204, page 16

MANITOWOC 1-YD. 1600
MORE MACHINE FOR YOUR DOLLAR!
Outclasses comparable rigs in every ...important performance feature

	Manitowoc 1-yd. 1600	Competitive 1-yd. Machines					
		A	B	C	D	E	F
Shovel Boom	22'6"	21'	21'	20'	21'	21'6"	21'
Crane Boom	45'	40'	40'	35'	40'	40'	30'
Trench Hoe Boom	22'	24'	21'	20'	20'	24'	19'
Air Controls Available	YES	NO	NO	NO	NO	NO	NO
Weights (in lbs.) Shovel	79,500	63,325	54,670	53,500	57,750	61,000	62,850
Crane	70,300	54,870	53,000	53,400	53,950	53,000	54,300
Dragline	70,580	55,070	53,725	51,700	53,600	53,000	54,100
Trench Hoe	75,415	62,625	52,430	62,000	53,400	61,000	60,400
Rated Capacity at 12' Radius with 45' Boom (Pounds capacity)	40,000	39,000	35,700	36,200	36,500	40,000	34,600
Price Comparison (per pound)	Lowest in its class	9c per lb. higher	11c per lb. higher	7c per lb. higher	12c per lb. higher	14c per lb. higher	10c per lb. higher

You get more for your money with a Manitowoc Model 1600. No other 1-yd. unit in the field offers as much in quality features, gross weight and actual price per pound. Here's a one yard machine with the speed and guts to outperform many 1¼ and 1½-yd. units.

Simply designed, with only 13 gears and pinions assures more useable power from every unit of horsepower; a real heavy weight, with weight where weight is needed; easier maintenance with less downtime; torque converter available for smooth power, precise load handling; completely *self-removable* counterweight (12,000 lbs.) speeds transport between jobs; large, wide crawlers and roller path increase stability; rugged construction throughout keeps machine on the job.

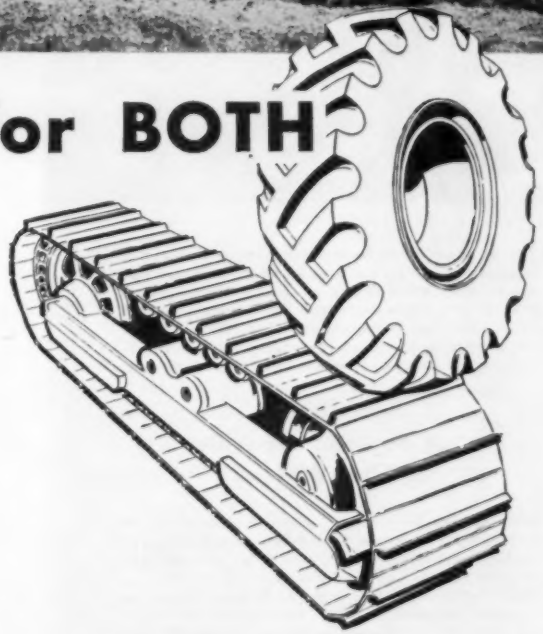
Compare the outstanding advantages of the 1600 with ordinary 1-yd. rigs — contact your Manitowoc distributor for the complete story.

MANITOWOC ENGINEERING CORP., Manitowoc, Wis.

MANITOWOC
SHOVELS 1-5½ YD. Speed Crane CRANES 20-100 TON

. . . for more details circle 198, page 16

There's a place for BOTH



Work problems today demand modern equipment that can do specific jobs faster and at lower cost. Tournatractor is a modern tractor designed to take advantage of . . . *power, traction, speed* and *mobility.* It does not offer as much drawbar horsepower at speeds below 2 miles per hour as do track-type tractors of equal engine horsepower. But, if your job conditions are such that you can capitalize on *speed* and *mobility* — with a machine that delivers comparable traction at present day speeds, we suggest you consider the *new* LeTourneau-Westinghouse Tournatractor. The cost is 10% below that of track-type tractors with torque converters and comparable engine horsepower.

Before you buy — EVALUATE

1 — Your demands for power
2 — Requirements for traction
3 — Advantages of speed
4 — Need for mobility

After giving careful consideration to all of these factors when selecting a tractor, questions in regard to your specific application may still be in your mind. The best way to dispel all doubt about the qualifications of any tractor is to see it perform on your job.

We will be happy to arrange the demonstration of a Tournatractor on your job, to prove that this rubber-tired tractor has the *speed* and *mobility* that can pay off for you. Call or write today. No obligation!

Tournatractor—Trademark Reg. U.S. Pat. Off. CT-1145-G-b

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS
A Subsidiary of Westinghouse Air Brake Company

. . . for more details circle 250, page 16

WHERE QUALITY IS A HABIT

For any Earthmoving Job . . . Euclids

These "Eucs" have been the outstanding choice of contractors, mines, quarries and industrial users of heavy duty off-highway haulers for many years. Models with single drive axles have capacities of 10, 15 and 22 tons . . . engines of 128 to 300 h.p. . . . 5 or 10 speed transmissions or Torqmatic Drive . . . standard or quarry body available for all 3 of these models.

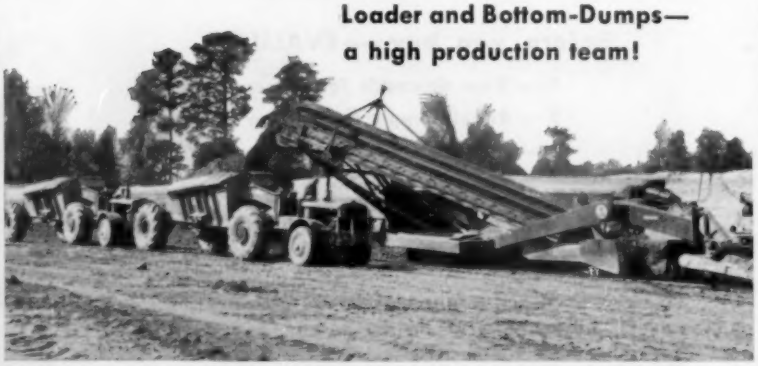
Rear-Dumps with payload capacities of 10 to 50 tons

Utilizing the Twin-Power principle pioneered by Euclid, the 34-ton and 50-ton "Eucs" are designed for jobs where large tonnage must be moved. Two engines provide a total of 400, 436 and 600 h.p. . . . each engine drives one of the drive axles through a separate Torqmatic Drive . . . hydraulic power steering and exhaust heated bodies of 24 and 32 yd. struck capacity.

A complete line of off-the-highway equipment that gets more work done at lower cost

For over 25 years Euclids have delivered "plus" performance on hundreds of the toughest jobs. Simple, rugged construction, combined with advanced engineering that provides easy operation and maintenance, results in dependable work-ability. Wherever you see "Eucs" at work—on small jobs where one or two units maintain production or on big yardage projects requiring large fleets of equipment—you can be sure they are doing the job at lowest cost. Before you decide on any equipment for your present or future work, check the complete Euclid line. Your Euclid dealer will give you facts and figures on the models that meet your requirements and show you why *Euclids are your best investment.*

Loader and Bottom-Dumps— a high production team!



Bottom-Dump Euclids have struck capacities of 13, 17 and 25 cu. yds. and engines of 218 and 300 h.p. They provide fast non-stop dumping on fills, into drive-over hoppers or spreading in windrows through wide, full length hopper doors. . . . top speeds loaded up to 30 mph. The low, wide hopper is easy to load by shovel, dragline, mobile loader and overhead hopper.

The "Euc" Loader, teamed with large capacity high speed Bottom-Dumps, can move up to 1200 bank yards per hour . . . makes shallow cuts up to 9' 6" wide, narrow cuts to 48" deep. Belt width is 54" . . . powered by 245 h.p. engine . . . all loader operations are hydraulically controlled by puller tractor operator.

EUCLID DIVISION, GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

are your best investment

Overhung engine type Scrapers of 7, 12 and 18 yds. struck capacity

Powered by engines of 143, 218 and 300 h.p., these scrapers are the fastest selling line in the industry. Advanced design of Euclid's hydraulic lever action, bowl and cutting blade provides fast, easy loading. The 18 yd. model has Torqmatic Drive . . . all have NoSpin differential and Euclid planetary drive axle . . . unequalled accessibility of power train and major components.

Four-wheel Tractor Scrapers

These 12 and 15.5 yd. scrapers have maximum stability for high speed hauls and rough roads. At 3:1 slope heaped capacity is 14 and 18 yds. A 200 or 218 h.p. engine with 5-speed transmission powers the 12 yd. scraper . . . drive tires are 21.00 x 25 standard with 24.00 x 25 optional. The 15.5 yd. scraper has 300 h.p. engine with 10-speed transmission or Torqmatic Drive . . . standard tires are 24.00 x 25 with 29.5 x 25 optional . . . a 17 yd. bottom-dump trailer is interchangeable with this scraper.

TC-12 Twin Crawler

A completely new concept in tractor design and performance, this Euclid tractor has two 194 h.p. engines (388 h.p. total) with a separate Torqmatic Drive for each track. Changing from one speed range to another (top speed of 8.3 mph) or to one of the three reverse speeds can be done under full power. Available drawbar pull is equal to or greater than gross weight. Planetary drives can be serviced without removing track, frame or drive sprocket.

Twin-Power "Euc" Scraper

The Model TS-18 is powered by two engines with a total of 436 or 518 h.p. It is a one-man earthmoving crew. . . self-loads and works under conditions that stop other scrapers. Tractor has a 218 h.p. or 300 h.p. engine with Torqmatic Drive . . . scraper wheels are driven through Torqmatic Drive by a 218 h.p. engine. Tires are 27.00 x 33 with 33.5 x 33 optional. Heaped capacity at 3:1 is 21 yds.

Rear-Dumps, Bottom-Dumps, Scrapers, Loaders, Tractors

. . . for more details circle 255, page 16

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

EUCLID

GM MORE POWER FOR YOU

How wide range of work keeps high-speed loader busy all year 'round

On this road-widening job, surplus materials are loaded from windrow into truck in a matter of seconds. No traffic interference.

Here is a heavy-duty, self-propelled, belt-type loader having a wide range of applications for highway departments. It loads practically any type of loose material out of windrows or stockpiles. In addition to high loading capacity, it gets around fast from job-to-job.

Use Adams TraveLoader for picking up surplus material on road and street construction or reconstruction. Use it for loading materials out of borrow pits and stockpiles. TraveLoader works fast in dirt, sod, sand, gravel, crushed stone, slag, cinders, snow. It loads topsoil for landscaping with no prior preparation.

How it works

TraveLoader loads in any one of a wide range of 5 working speeds from 0.29 to 1.9; has 5 travel speeds from 3.90 to 26.7. The floating, revolving, screw-type feeder automatically adapts itself to the load ahead and places a continuous flow of material on the conveyor-belt. Trucks can be loaded with loose materials at up to 10 yards per minute. Travel speed range makes it easy to keep TraveLoader working to capacity. Trucks load behind loader, do not interfere with passing traffic. Moves job-to-job over highways and city streets at speeds to 26.7 mph.

Heavy, durable construction

All-welded, box-construction, one-piece frame extends full length of machine. Heavy-duty front and rear axles, sturdy feeder mechanism, rigid conveyor with sealed-for-life roller bearings, give TraveLoader the necessary strength to handle heavy loads at fast speeds with minimum downtime and maintenance. *Available with gasoline or diesel engines.*

Easy to operate

You will like TraveLoader's centrally-located control station . . . up out of the dust, permitting clear vision in all directions. Easy, fast, hydraulic controls, give quick adaptability to any working condition.

Get all the facts on the Adams TraveLoader from your LeTourneau-Westinghouse Distributor.

Side-shiftable cross conveyor (optional) loads trucks on either side of machine, assures proper balancing of load. A great time-saver in materials yards. Conveyor position power-controlled from operator's cab.

Cities have many uses for TraveLoader. For instance, ice and snow on city streets can be loaded at the rate of 12 to 20 yards per minute. TraveLoader finds work the year 'round.

Here a contractor cuts and loads gravel out of a natural bank. Many contractors and highway departments use TraveLoader for loading stockpiled materials of all kinds.

AL-5-G-b

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

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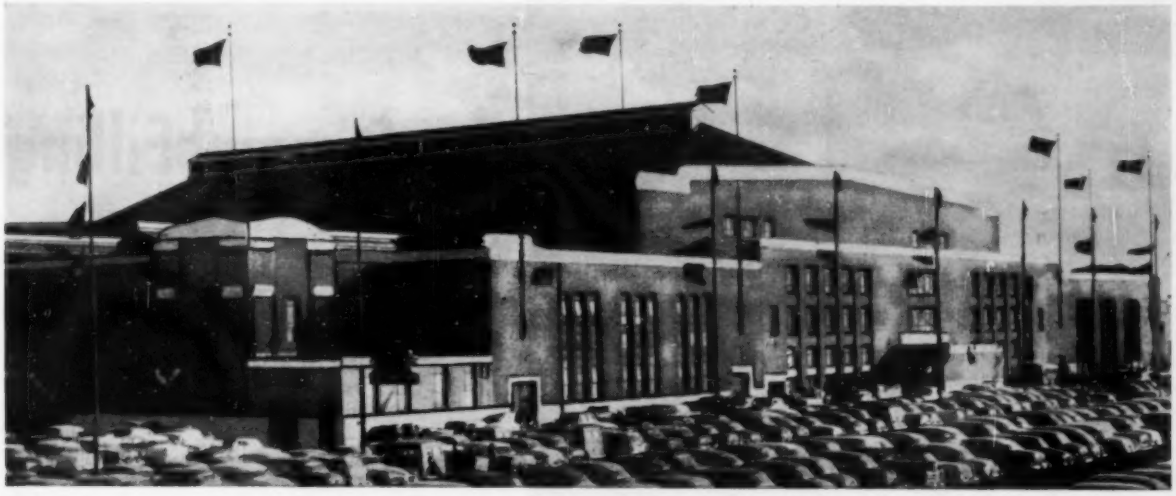
WHERE QUALITY IS A HABIT



This is your meeting place for the Chicago Road Show

Enlarged Amphitheater Ready for Big Show

Welcome to Chicago, where you will attend the largest industrial show ever staged, and where many technical sessions have been arranged for visiting engineers and officials.

HIGHWAY contractors, engineers, officials, and visitors were planning, as this issue went to press, to join the crowd—an estimated 40,000 strong—which will attend the ARBA 1957 Convention and Road Show. The date, once again, is January 28 through February 2. The place: the Chicago International Amphitheater. Already the world's largest exhibit hall, this great building has been enlarged for the record-sized machinery exhibition, by the addition of a 410 by 270 foot hall.

As explained by Road Show Chairman Julian R. Steelman, the amphitheater will be the equivalent of twelve football fields in size—which gives us all some inkling of the array of products being unveiled on this occasion.

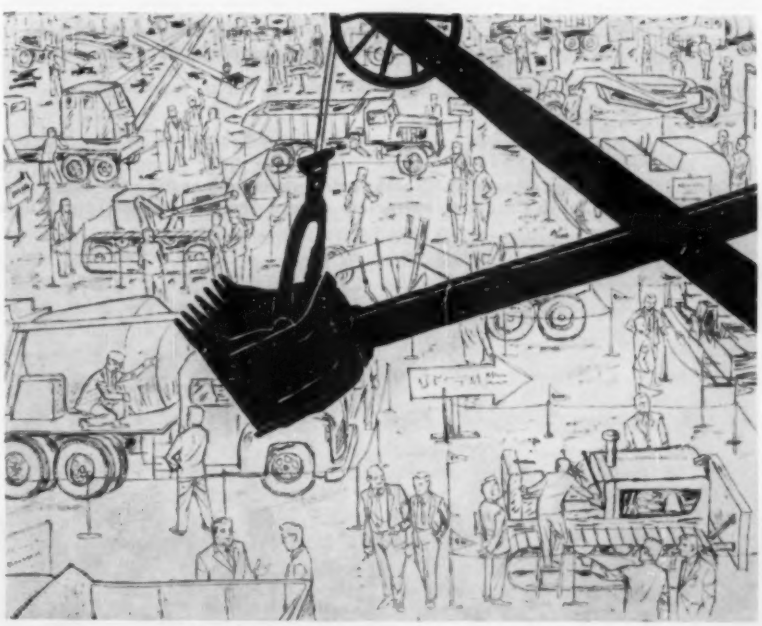
Equipment on Display

Nearly 250 equipment manufacturers will have thousands of pieces of equipment on view.

And over 50 manufacturers of materials and supplies will have an "exhibit within the exhibit"—including hundreds of products required for installation or in the construction of highways, streets and bridges.

Published in this issue is the most complete list the editors could get of the individual Exhibits—their booth number, what will be displayed, and who is in attendance for the various companies.

Also in this issue is a parade of new product announcements (Pages 16, 107, 176, and 225), many of which were released in conjunction with the Show.



● Artist's conception of the exhibit halls, where new profit-making and production boosting equipment models will be unfurled.

• Surcharged granular Special Fill material being pushed into the swamp by a pair of Cat D8s. Coffee Creek Swamp.

Swamp Filling

Large dragline yardages were required on several of the contract sections. Jetting to consolidate granular backfill used at some locations. This review describes the problems and methods at some of the largest and most troublesome bog crossings.

By Hubert C. Persons
Contributing Editor to Roads and Streets

SWAMPS on the right-of-way of the 156-mile Indiana Toll Road necessitated removal of over 4,000,000 cu. yd. of peat, muck and marl and backfilling with 5,000,000 cu. yd. of granular borrow for Special Fill. This work which has figured in many of the grading contracts has been done largely with draglines variously assisted by dump wagons, dump trucks, scrapers and dozers. In some cases a temporary surcharge was used. This surcharge remained in place until the required consolidation was obtained, the material being removed later and used elsewhere. In other locations a rolling surcharge proved satisfactory.

Jetting was used in three locations to help expedite the work and provide additional consolidation of the granular fill, which in these three instances was placed uncompacted to the elevation of the top of the required temporary surcharge. In most locations where the standard method of partial excavation and displacement was used, the specified "rolling" surcharge proved satisfactory. No surcharge of any type was required in the standard total excavation method.

The toll road line traverses the heart of the morainic swamp country of northern Indiana, an area of recent

• Route 1 Swamp (see Figure 4). Northwest dragline sidecasting the relatively dry material. Trucks and dozer building surcharge. South Carolina contractors enountered many special conditions in this glaciated area.

Methods on the Indiana Toll Road

• **Coffee Creek Swamp. The 5-yard Manitowoc dragline seen casting muck over the far side of the railroad fill which paralleled the road centerline. Northwest dragline sidecasting to near side, or delivering the larger machine for rehandling. (See Figure 2).**

glacial history dotted with swampy streams, bogs, peat-filled potholes and glacial outwash material. Extensive sand deposits and otherwise excellent soil conditions prevail along most of the line, but swamp problems occurred at one or more places in nine design sections. So formidable were the swamps in total that J. E. Greiner Company, the general consultants imported a task force of soils engineers heavily experienced in swamp field work as well as in theoretical soil mechanics.

Advance location and design included painstaking attention to the swamps. The highway line was located to avoid bad areas in many instances. Exploratory borings made at all bog crossings, and specifications set up requiring certain features common to all of them. Granular backfill was specified to tbe placed over swamps to an elevation of 2 ft. above swamp level, finer-grained material being permitted on upward to template grade. For the granular material, the minus 200 fraction was limited to a maximum of 10 percent, and the portion passing the No. 40 sieve to a maximum P.I. of 3 and a maximum L.L. of 25.

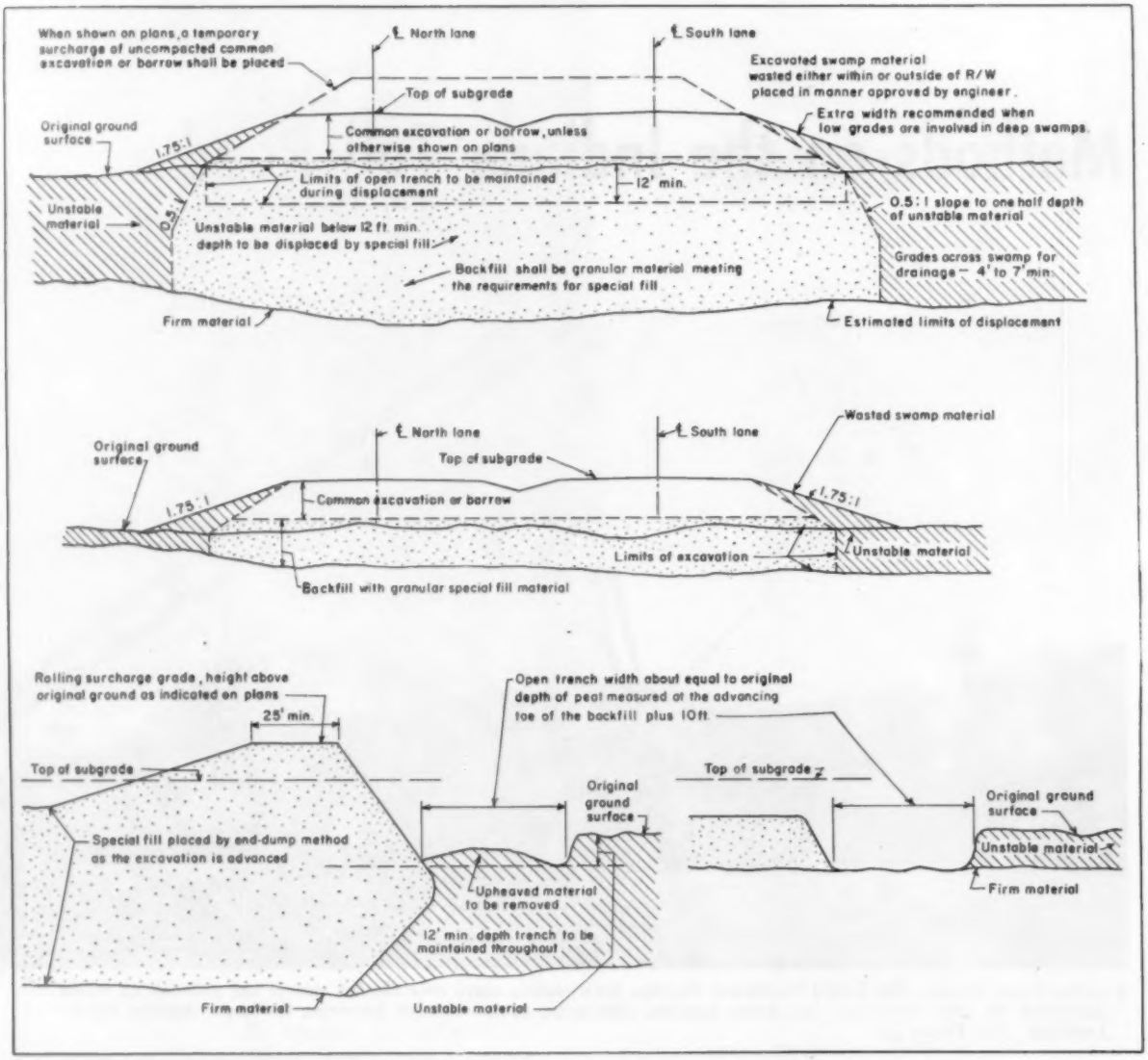
With this preamble, let us look at several of the more interesting individual jobs.

Coffee Creek Swamp

Coffee Creek Swamp involved 490,000 cu. yd. of removal and 750,000 cu. yd. of backfill not including surcharge. The swamp had a central troublesome section about 700 ft. long, where depths averaged 50 ft. with 68 ft. maximum. Elsewhere along the 2,100 ft. length, removal and replacement had to be carried only to depths of 6 to 10 ft. The material here consisted of muck, peat, sand and marl under 4 ft. of heavy topsoil.

This swamp, which is in Design Section D-2 in Porter County, looked so bad that the contracting engineers, J. Stephen Watkins, suggested the possibility of relocating the centerline 200 ft. to the south to avoid the deepest part. According to project engineer W. T. Welch, the borings showed that avoidance of the swamp would be imposisble by an economicaly feasible relocation. Estimates for carrying the roadway on trestles were $275,000 higher than for swamp removal and backfilling, so the latter course was adopted.

This swamp was part of the 7-mile construction contract covering Sections C-15 and C-16, awarded early in 1955 to Traylor Bros., Inc., of Evansville, Ind. Bid of 69c per cu. yd. for swamp



• **Figure 1. Details of typical swamp situations and procedures, as shown on Standard Drawing Sheet No. 18 provided to all contractors on Indiana Toll Road**

excavation and 68c for granular borrow was based on the fortunate finding of a satisfactory borrow source which required only two miles of haul. The swamp work was done by A. L. Dougherty Co., of Indianapolis, under sub-contract.

The Dougherty firm planned its attack around a Manitowoc Model 4500 dragline equipped with a 140-ft. part-aluminum boom and 5-yd. bucket with liner to hold the liquid materials. Two Northwest 2-yd. draglines and a small dragline rounded out the team. According to project engineer Welch, it was the larger dragline with its ability to bail out material from 50 ft. depth and cast over a high spoil bank which set a new pace for such work.

Borrow material was excavated by dragline and transported to the fill using a fleet of 18 Euclid bottom-dumps and two Cat D8 dozers.

Swamp Strategy

The strategy at the swamp (Figure 2) was planned partly around the existence of an abandoned railroad fill 30 ft. high above the swamp and lying immediately parallel to the highway grade. The problem was to do the excavation without causing the adjacent railroad fill to slide laterally into the hole. This was a real danger despite the possible stabilizing action of timber trestle piles embedded in the fill. To eliminate this possibility, the fill was cut down with dozers, which shoved material laterally outward toward the creek. A dam was built along the creek to contain excavated or bulldozed material in compartments and prevent clogging of the creek channel. A ridge of old fill material about 20 ft. high was left to preserve the dike effect. Eventually the creek was relocated to provide room for muck disposal.

Backfilling and mucking were carried forward from one end. A typical scheme was for the 5-yd. dragline to operate from a working platform in the edge of the railroad fill. Excavation extended 90 to 100 ft. out from either side of the centerline. The old consolidated fill at this stage acted as a

dike between the excavation and the creek which angled along the far side of this fill. The old fill was found to have a typical rounded consolidated core extending well into the swamp bottom.

The excavation material was soft peat with very little marl. The decision was made to try and displace the muck in conjunction with dragline removal, by constructing the fill to a surcharged height of 30 ft. for a permanent fill height of 12 to 15 ft.

Meanwhile, the 5-yd. dragline had begun mucking and casting material on the far side of the railroad fill. Some blasting of the mud wave on the far, or south, side was necessary, due largely to the stiff, compressed material placed there from the old fill. The 2-yd. draglines were stationed usually on the opposite side of the hole from the 5-yd. machine, where they cast to the big machine for rehandling. Very little spoil was placed on the north side of the hole.

The contractor, here at his request, was given a chance of using total excavation or partial excavation and displacement, as conditions warranted. The plans originally specified partial excavation to a depth of 25 ft. On this job the partial excavation was limited in the special provisions to a progress of 4,000 cu. yd. of muck displacement per day, this limit being adopted to give the peat immediately ahead of the advancing surcharge sufficient time to displace and move ahead into the excavation.

Partial Removal Procedure

For much of the job the contractor followed the partial removal procedure. Filling was done in two 10-hour shifts to keep up a degree of continuity. At certain stations, however, complete excavation was elected, and placement was stepped up to 6,000 or 7,000 cu. yd. per day. At one location filling went on for several days while the sand disappeared without any visible progress, leaving the draglines at the same location continuously bailing displaced peat. The Coffee Creek work began late in 1955, and progressed through the winter.

The engineers were particularly concerned with maintaining a proper shaped nose as the surcharge fill advanced. A full width transverse face on the surcharges was insisted upon rather than a rounded or pointed nose. Past experience has showed that this shape results in more satisfactory displacement of peat and also prevents excessive caving along the walls of the excavation.

• **Rattlesnake Swamp. Routine bailing and sidecasting of muck in progress using a Bucyrus-Erie 54-B dragline.**

The job was not without its mishaps, including a slip-out of a section of the old embankment, but borings made promptly as the fill advanced showed generally satisfactory displacement with good stability where minor pockets of peat were enveloped.

The purpose of the 30 ft. temporary surcharge was to provide sufficient weight to cause peat displacement and also to consolidate any minor buried peat pockets. Therefore, because of differential movement due to these processes, any mechanical compaction provided would be destroyed. This fill, placed to depth up to 80 ft. without rolling, required some means of densification. In anticipation of the necessity to minimize fill settlement under these conditions, the plans provided for the jetting operation. Here jetting was done with good effect to consolidate the fill.

Jetting equipment at Coffee Creek included a Marlow pump which supplied water at 65 to 100 psi pressure via a 4-in. trunk pipe and 1-in. connections to ¾-in. nozzles. Jetting was done by Westville Engineering Co., of Westville, Indiana.

Salt Creek Swamp

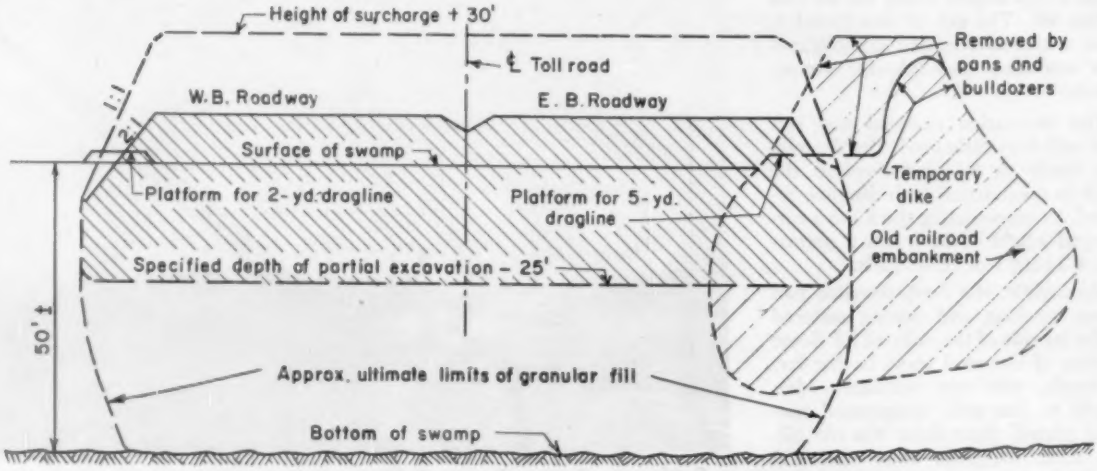
The Salt Creek swamp, another major dragline tussle, was also located largely in Traylor's Contract Section C-15. This swamp covered 1,700 ft. of highway line, and its maximum depth of 39 ft. included muck, peat, and layers of sand and clay chiefly in liquid or semi-liquid form and largely overlaid by 4 ft. of topsoil. The bid items included 255,000 cu. yd. of swamp excavation at 64c per cu. yd. and 350,000 cu. yd. of granular backfill at 58c. Borrow was obtained within a few hundred feet.

Dyer Construction Co., of Dyer, Ind. which subcontracted this swamp, used a Manitowoc Model 3900 dragline with 100-ft. boom and 3-yd. bucket, a Northwest dragline with a 100-ft. boom and 2-yd. bucket, and two Lima 703 draglines with 75-ft. booms and 2-yd. buckets.

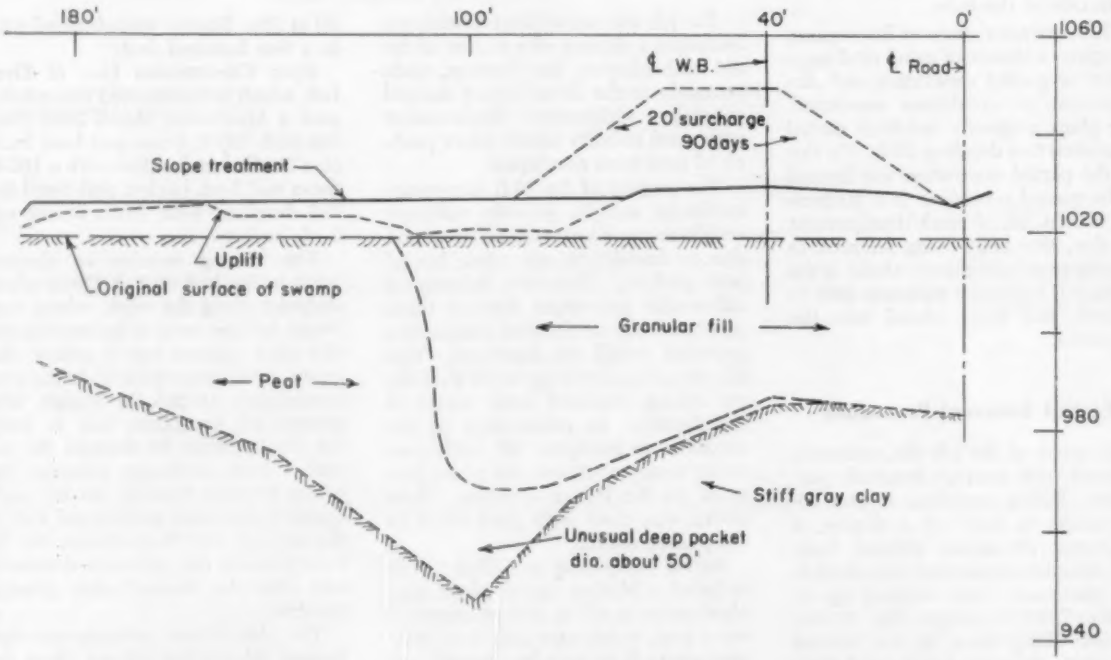
This swamp reaches its deepest point in the bed of Salt Creek about midpoint along the work, where twin 3-span bridges were to be constructed. The chief concern was to secure adequate initial consolidation in the area immediately around the bridge. The general job procedure was to build the displacement fill through the job with a 20-ft. surcharge, construct the bridge footings through the fill while draining the creek around one end of the swamp, and then remove the fill from between the piers and abutments and clear the channel while placing the deck.

The old railroad embankment also flanked this job but did not affect the procedures. Immediately following the topping out of the surcharge, jetting was done by Westfield Engineering Co., as described for the Coffee Creek job, but was confined to about 400 ft. of the fill around the bridge site. The nozzles were penetrated into the embankment to a depth 5 ft. above bottom of swamp to break down any shearing resistance that might have remained.

Eastward in Steuben County, near the Ohio line, another swamp job made "a story in itself," to quote the engineers. This was rattlesnake Swamp in Design Section D 11 under W. H. McFarland, Binghamton,



• **Figure 2. Coffee Creek Swamp. Cross-section of typical situation, showing how old parallel railroad fill was utilized in conjunction with filling operations.**



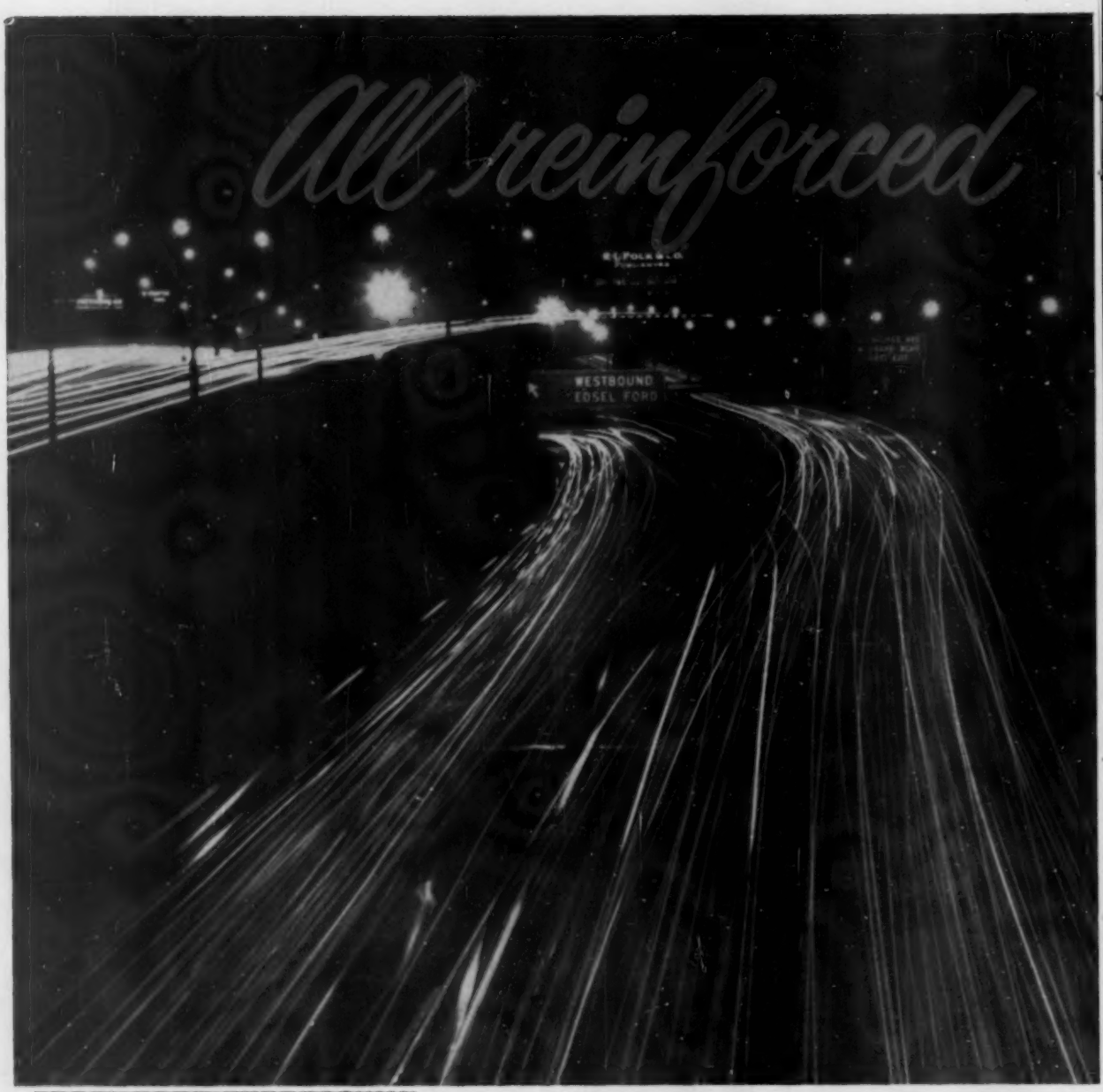
• **Figure 3. Rattlesnake Swamp. Special treatment of embankment, with 90-day surcharge, shown in relation to the cause of the trouble: a deep muck pocket.**

N. Y., contracting engineers, with M. G. Church as resident engineer. The swamp was part of the contract covering sections C-51, 52 and 53, held by Suber & Co. and Ballenger Paving Co., joint venture firms from South Carolina. Swamp removal totaling 550,000 cu. yd. was required at 18 locations in the job, with 800,000 cu. yd. of backfill. Rattlesnake Swamp (Figure 3) was one of the worst headaches.

The material to be removed here consisted of a relatively dry, very plastic clayey peat or peaty clay on a clay foundation, the swamp extending to 44 ft. For equipment, the firm brought in a Bucyrus-Erie 54-B dragline with 100-ft. boom and 2½-yd. bucket and a Northwest dragline with 80-ft. boom and 2-yd. bucket.

The contractor at first attempted complete removal in lieu of the method set up by the engineers, which consisted of partial excavation with rolling surcharge. His planned procedure was to dig a full-depth trench 30 to 40 ft. wide, parallel to centerline then widen the excavation by means of additional trenches with the dragline on the undisturbed bank. Serious cavings developed as the work progressed, requiring rehandling and disposal of the excavated peat by the firm's Euclids.

(Continued on page 70)



EDSEL FORD EXPRESSWAY
JOHN LODGE EXPRESSWAY

PENNSYLVANIA TURNPIKE

with AMERICAN WELDED WIRE FABRIC

EASY TO INSTALL. American Welded Wire Fabric comes in prefabricated sheets that can be placed quickly with minimum crews. It stays in place during pouring.

LOW COST. American Welded Wire Fabric has high-strength steel wire, electrically welded together for positive anchorage. The concrete slab is effectively reinforced with less steel than other types of reinforcement; so you have less steel to buy and less to handle. American Welded Wire Fabric keeps down maintenance costs, too, because it prevents destructive cracking, keeps roads smooth and safe.

VERSATILE. American Welded Wire Fabric comes in wide sheets for continuously reinforced concrete pavements in wire sizes up to and including ½" in diameter, at 2", 3", 4", and 6" on centers. The use of American Welded Wire Fabric increases the strength of the concrete slab by 30% over that of non-reinforced concrete.

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GENERAL OFFICES: CLEVELAND, OHIO

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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

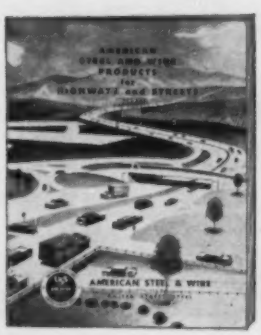
Every type of reinforced concrete construction needs

USS American Welded Wire Fabric

UNITED STATES STEEL

OHIO TURNPIKE

FREE CATALOG



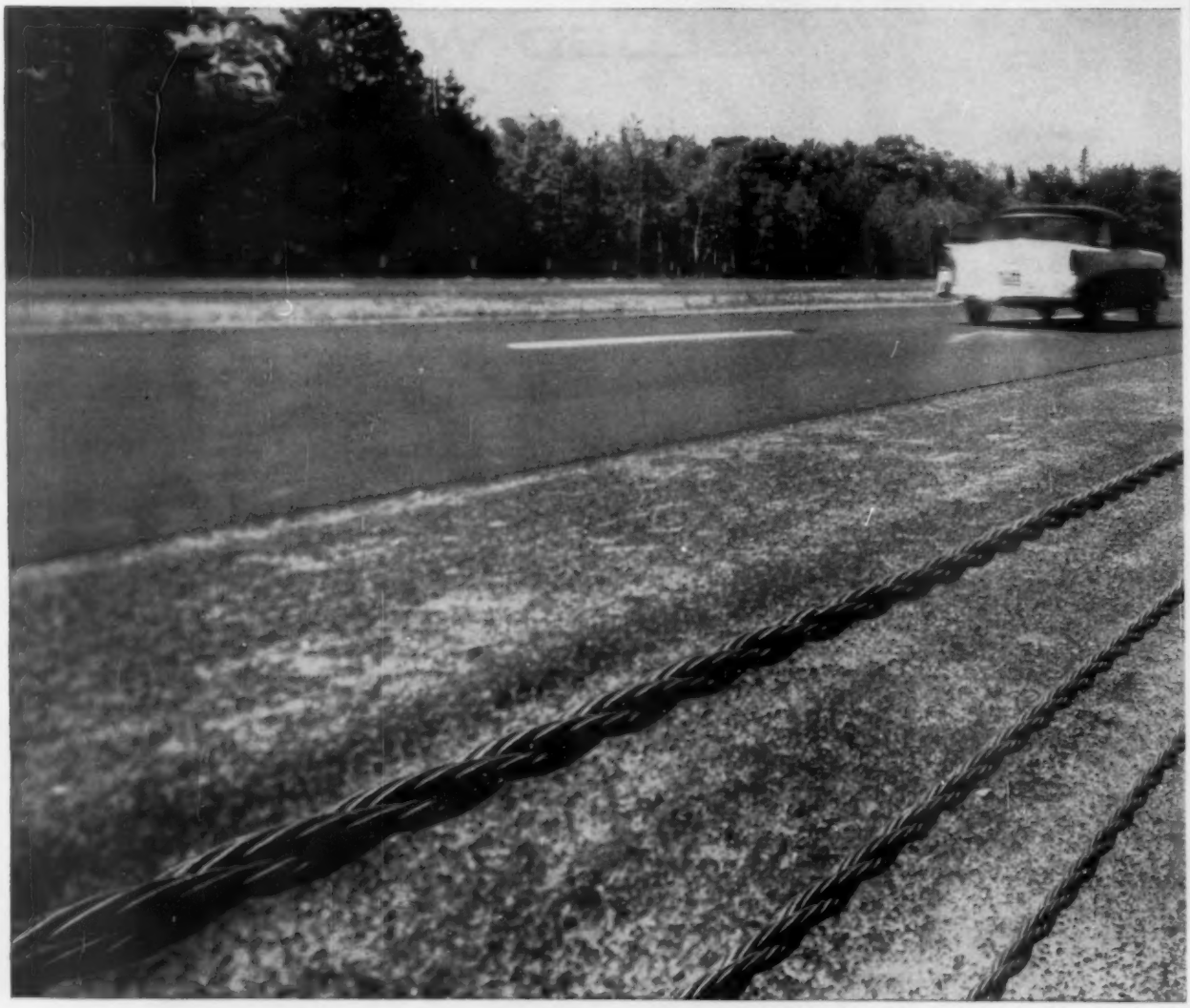
American Products for Highways and Streets

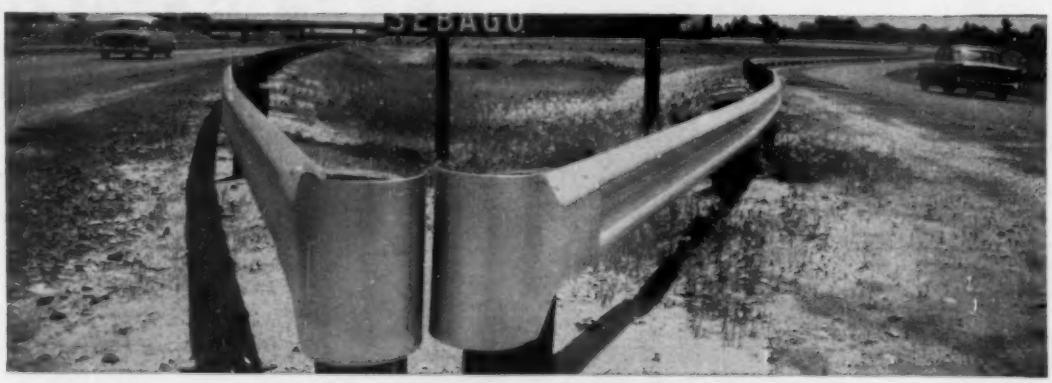
Here's a brand-new catalog describing the entire American line of products for highway and street construction. Includes application photographs and helpful information about each of these products. Send for your copy of this informative catalog today. Use the check box coupon at the end of this 8-page unit. It's free!

. . . for more details circle 288, page 16

On New Maine Turnpike

Two types of COMBINE SAFETY WITH





American Highway Guard
GOOD APPEARANCE

▲ American Multisafty Cable Highway Guard, like this used on the new Maine Turnpike, provides two-fold protection. First, it restrains cars from plummeting off the berm. Second, the combination of resilient steel cable and resilient spring-steel offset brackets cushions the shock of collision and helps minimize damage to the vehicle, serious injury to the passengers.

◀ American Beam-Type Highway Guard is also used on parts of the Maine Turnpike. It provides a strong, attractive, durable guard.

THE MEN who designed the Maine Turnpike needed two types of highway guard. Along some sections they wanted to use cable guard; at other sections, they wanted beam-type guard. They obtained *both* types from American Steel & Wire. American Multisafty Highway Cable Guard and American Beam-type Highway Guard assure an economical installation that will stay attractive *and* protective with minimum maintenance. With these two guards they combined essential safety with desirable good looks.

American Multisafty Cable Guard comes in two basic types: 3-cable guard, which gives adequate protection at highway speeds up to about 50 miles per hour; and 4-cable highway guard, which protects up to about 75 miles per hour. A Super Guard consists of six or eight cables for special situations, where an extraordinary margin of safety is desired. In any installation, cables can be added or replaced quickly and easily if changing highway conditions demand additional protection.

Remember the quality and the reputation of American Steel & Wire when you need construction materials of any type of highway guard, wire fabric, road joints, or wire or strand for prestressed concrete. Send the coupon for complete information about any of these products.

AMERICAN STEEL & WIRE DIVISION
United States Steel, General Offices: Cleveland, Ohio
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS Multisafty Highway Guard

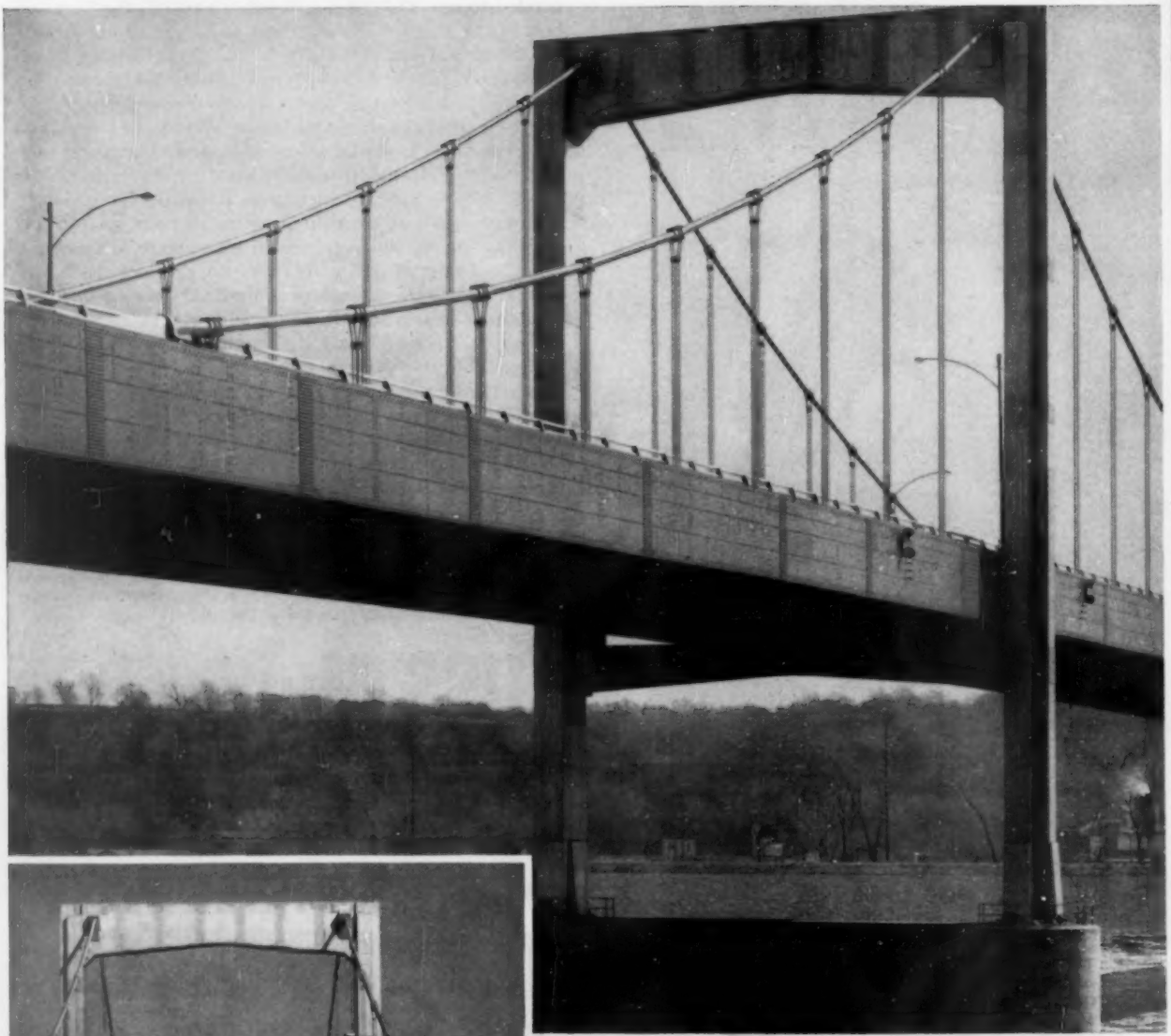
USS **UNITED STATES STEEL**

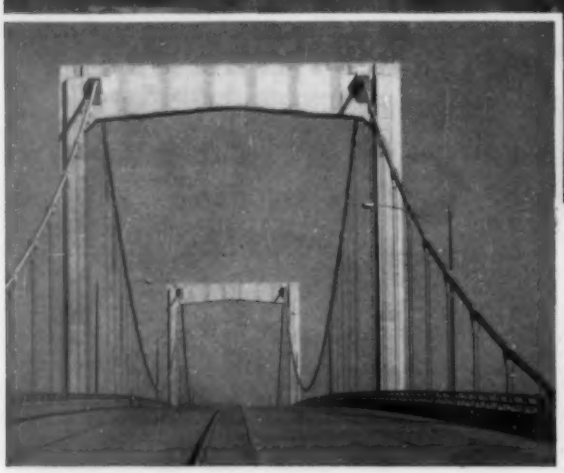
How many products does United States Steel manufacture for road builders?

Have any idea? Know what they are and how they can strengthen and protect your roads? The ads in this 8-page unit describe some of them, but there are many more. You can learn all about the entire line of USS Road Building Products at the ARBA Road Show. Be sure to visit the United States Steel exhibit. You'll see an animated display showing how and where these quality products are put to work in the step-by-step construction of a model highway. Don't miss it! The United States Steel Exhibit at the ARBA Road Show, International Amphitheater in Chicago, Jan. 28 through Feb. 2.

. . . for more details circle 288, page 16

Longest **self-anchored** suspension built with American Tiger Brand





The Right Wire Rope will do the trick!

The main cables and suspender cables were engineered and fabricated by American Steel & Wire Division. The main cables are built up of 37 strands each for a total of approximately 94,350 feet of Tiger Brand Galvanized Bridge Strand.

bridge in the United States

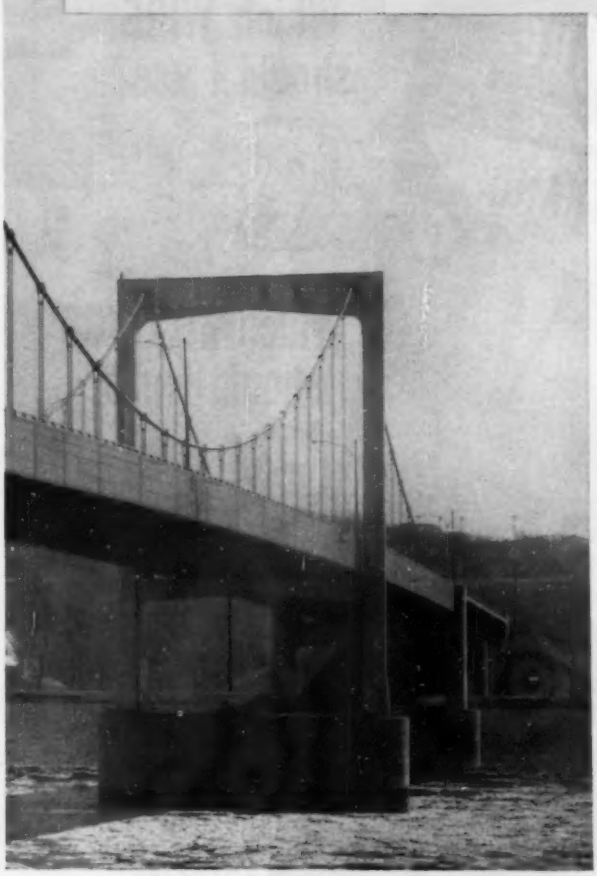
Pre-stressed Bridge Strand

The Paseo Bridge at Kansas City

This 1,232-foot bridge spans the Missouri River and is the longest self-anchored suspension bridge in the United States. The total length of the bridge, including two deck plate girder spans is 1,825 feet. Vertical clearance above high water at center of main span is 55 feet.

Engineers: Howard, Needles, Tammen & Bergendoff, Kansas City, Mo.

Contractor, Fabricator and Erector: American Bridge Division, United States Steel Corporation.



THE PASEO BRIDGE over the Missouri River at Kansas City, Missouri, is unique by comparison with other suspension bridges because it is self-anchored. That is, the stiffening girders themselves are designed and utilized to resist the tension of the main cables, instead of having huge anchorages at each end to resist this force.

This bridge has a 616-foot main span and two 308-foot side spans. Main cables are 12 inches in diameter and are built up of 37 strands—31 strands $1^{13}/_{16}$-inch diameter plus 6 strands $1\frac{1}{4}$-inch diameter. The cables are approximately 1,275 feet long and have a total combined strength of 27,500,000 lbs. To complete the main cables, galvanized soft steel wire is spirally wrapped around the combined strands to protect the cable and provide a smooth surface for painting.

Before shipping, the strands were pre-stressed to one half of their designed breaking strength for several hours. This is not only a thorough test of the quality of the material, but also produces a cable strand that will not stretch over the years due to use.

The stiffening girders carrying two 26-foot roadways are suspended from the main cables by 90 $1\frac{1}{2}$-inch diameter galvanized suspender ropes each having a breaking strength of 104 tons. They were also pre-stressed and fabricated to exact dimensions to fit their places in the structure without further work or adjustment.

American Steel and Wire Division is eminently fitted to handle important jobs like this. It has the engineering experience and complete manufacturing facilities to produce the finest bridge strand you can buy. Call or write for further information.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS AMERICAN TIGER BRAND WIRE ROPE

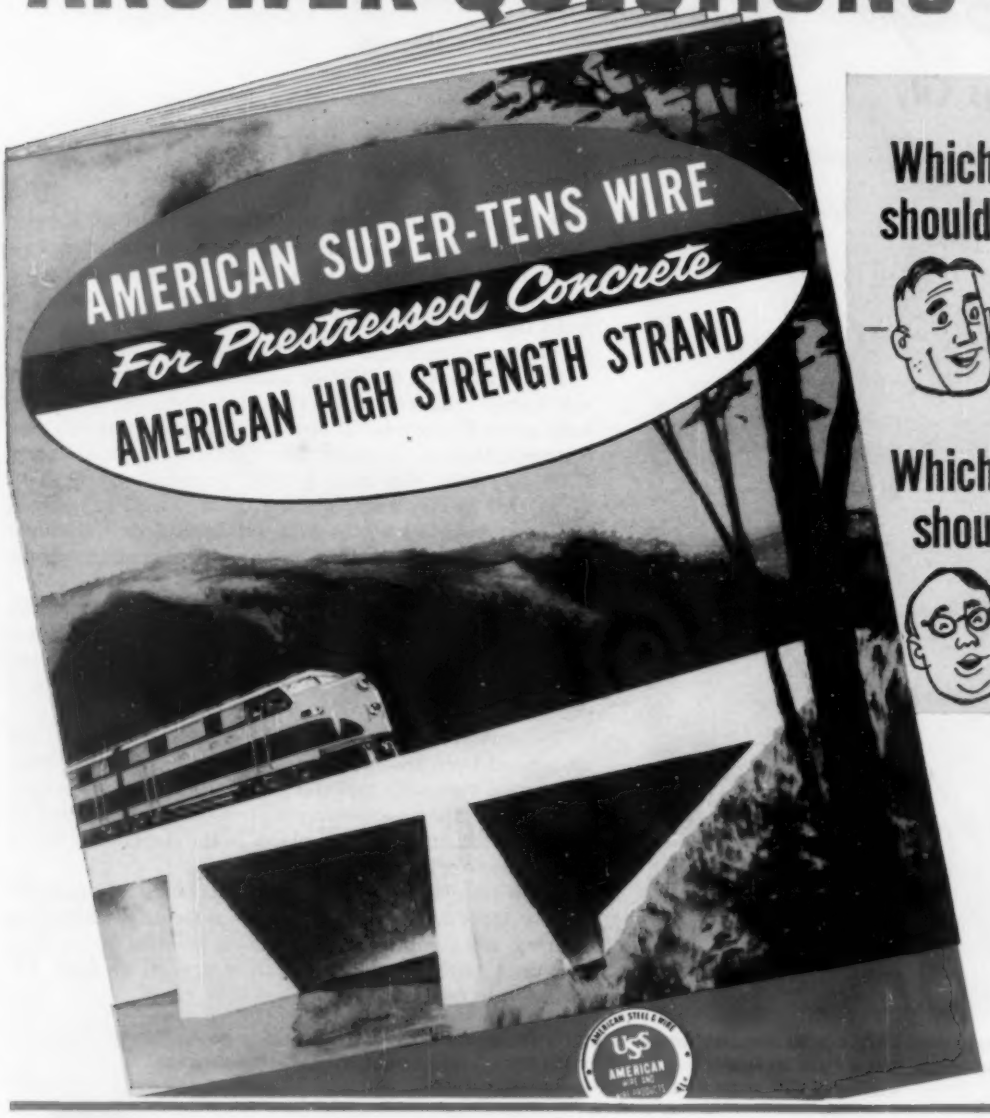
Excellay Preformed

UNITED STATES STEEL

. . . for more details circle 288, page 16

If you're using prestressed concrete...

THIS NEW BOOKLET ANSWER QUESTIONS LIKE



Which WIRE should I use?

Which FITTINGS should I use?

USS AMERICAN *Super-Tens* WIRE & HIGH

SEND THIS COUPON FOR A FREE COPY. This new 16-page booklet describes the complete line of high strength wire, high strength stress-relieved strand, and end fittings manufactured by American Steel & Wire. It contains stress-strain curves, typical tensioning loads and breaking strengths for American Super-Tens Wire and American High Strength Strand—quality products that are especially made for use in prestressed concrete. Send for your copy.

AMERICAN STEEL & WIRE DIVISION

United States Steel, General Offices: Cleveland, Ohio
Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, New York

STRENGTH STRAND

American Steel & Wire
Rockefeller Building
Cleveland 13, Ohio

Please send your descriptive booklets and information on the following:

- ☐ American Super-Tens Wire and American High Strength Strand
- ☐ American Products for Highways and Streets Catalog
- ☐ American Road Joints
- ☐ American Welded Wire Fabric for Portland Cement Concrete
- ☐ American Welded Wire Fabric for Airport Runways
- ☐ American Welded Wire Fabric for Asphaltic Concrete
- ☐ American Multisafty Highway Cable Guard
- ☐ American Beam-Type Highway Guard

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UNITED STATES STEEL

. . . for more details circle 288, page 16

• Route 1 Swamp. Jetting operating in progress (see Figure 4). Left view looking along outer side of special 20-ft. temporary surcharge. Showing how it has sheared and subsided under jet action.

General Instructions for Swamp Removal on Indiana Toll Road

Excerpts of statement carried on General Construction Plan Sheet No. 18, showing cross-section and elevation of typical working schemes.

Excavation and backfill shall be carried on progressively across the swamp and so coordinated to maintain an open trench of length approximately equal to the original depth of the peat deposit, measured at the advancing toe of the backfill, plus 10 ft., unless written permission to use an alternate procedure is granted by the Engineer.

Upon approval of the Engineer, the excavation and backfilling may be carried on as separate operations where excavation of swamp materials results in a dry trench.

Surplus waste swamp material in excess of that used to flatten slopes shall be disposed of as shown on the Plans, or in accordance with special Article. Disposal of waste swamp materials, shaping of slopes in the swamp area and the establishment of satisfactory permanent drainage facilities as shown on the Plans or directed by the Engineer, shall be accomplished prior to paving operations.

The Contractor shall at all times maintain suitable drainage by ditches, temporary culverts or other methods satisfactory to the Engineer, during all operations of excavation and backfilling.

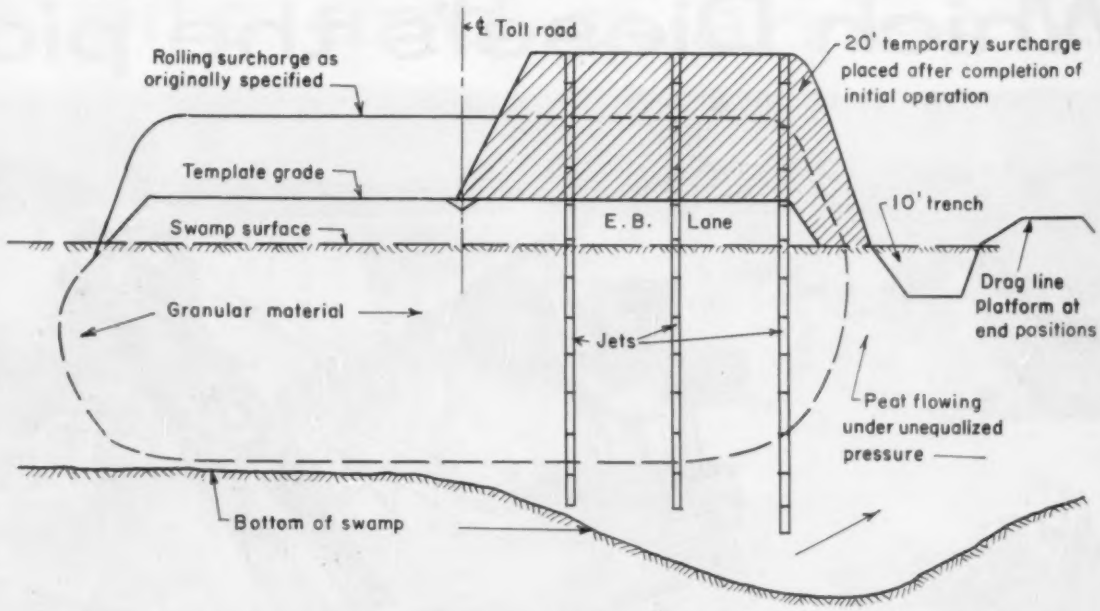
When shown on the Plans, a "temporary surcharge" composed of uncompacted suitable material from Common Excavation or Borrow shall be placed above the elevation of the completed subgrade. The surcharge shall be maintained for a maximum period of 90 days. The required period of time shall be as shown on the Plans or as directed by the Engineer.

If conditions are such that the width of open excavation cannot be maintained, with approval of the Engineer, the length of the open trench may be decreased provided the depth of excavation is increased proportionately.

The length of the full "rolling surcharge" shall be a minimum of 35 ft. or equal to the original depth of the peat, whichever is the greater, unless directed otherwise by the Engineer.

Special Fill shall be placed to an elevation 2 ft. above the original swamp surface, or to an elevation 2 ft. above water level if the swamp is inundated at the time of construction, unless otherwise shown on the Plans or directed by the Engineer. Special Fill may be end dumped to an elevation 2 ft. above water level. All material placed above that elevation shall be compacted in accordance with applicable provisions of Sec. B5.

Elevation of Special Fill after "rolling surcharge" is moved ahead, shall be 2 ft. above water level at time of construction. Final elevation of Special Fill shall be 2 ft. above water level if the swamp is inundated at the time of construction, unless otherwise shown on the Plans or directed by the Engineer. For compaction of material above water level.



• **Figure 4. Route 1 Swamp. Showing how temporary surcharge, with jetting, was used on one side to help force peat laterally into side trench, in process of obtaining static equilibrium.**

While not "making any money," the contractor progressed fairly well and completed the embankment to template grade. Subsequently it was found that a 6 in. wide crack enveloping a semicircular area had developed in the westbound lane over a portion of the swamp. Immediate additional borings revealed also that the specification granular material, required to be carried to 2 ft. above swamp level, had settled 6 or 7 ft. below the surface. In addition check borings showed about 5 ft. of peat under the north or outside shoulder and also a localized extremely deep pothole which had not been detected by the original borings, nor the cheek borings. The characteristics of this pothole were such that the fill in this locality rested on a steep underground slope.

Analysis of the information obtained resulted in the following treatment. The clay fill portion which had settled under the swamp level was removed and the embankment rebuilt with granular material to an elevation 2 ft. above grade. Then a 20-ft. surcharge was constructed and left in place for 90 days for the purpose of equalizing the forces causing movement. Evaluation of the field data obtained during this period showed that the surcharge had achieved its purpose, to the extent that the settlement had been decreased to a minimum rate. After 90 days had elapsed the surcharge material was placed over the swamp adjacent to the disturbed area to provide static equilibrium.

The lessons learned, as pointed out here by the engineers, is that, in morainic or glacial swamp areas, whenever even the slightest surface condition indicates the possibility of such local configurations of the swamp bottom may exist, the condition should be thoroughly investigated. The many borings taken on this job, right up to the moment of the pothole's discovery, completely missed this hole despite their close spacing.

This pocket of peat was not entirely removed. But thorough re-analysis by various established means show that the fill is now static. No surface indication to the contrary has occurred at this writing, some months later as paving is completed.

Route 1 Swamp

Also in the same Suber & Ballenger contract is what is known as Route 1 swamp (Figure 4), which is worth passing mention. At the extreme western limit of the swamp, check borings showed a deep pocket of peat under the shoulder of the eastbound lane. This pocket was a "V" shaped channel, 18 ft. below the normal swamp level and transverse to centerline. The first occurrence of peat was approximately 40 ft. from centerline with the depth increasing toward the shoulder.

The scheme adopted to stabilize this condition was as follows:

About 20 ft. of earth surcharge was placed on the eastbound side over the critical area. A trench 10 ft. deep was excavated in the swamp alongside the slope toe of the fill to invite faster lateral flow of peat from beneath the surcharged fill. A dragline operated from the ends of the trench to bail out material as the trench filled up. Then, three lines of jetting pipes were sunk through the surcharge, one line on center and one on each shoulder of the eastbound roadway. Nozzles were sunk to an elevation 5 ft. above the bottom of the swamp and water under pressure applied to destroy any shearing resistance and to expedite lateral flow of peat out and up into the trench. The jet pipes were then raised successively in 5 ft. lifts, jetting about two hours at each elevation to insure thorough fill consolidation.

During the jetting operation the outside of the surcharge settled approximately 10 ft. The disturbed area was rebuilt to the full height of the surcharge and jetting continued until no further displacement occurred. Here again, final check borings show that satisfactory stability has in all probability been achieved.

The swamp locations here touched upon are but four of many areas requiring special advance consideration

(Continued on page 75)

Which Diesel's the pick

It's GM—used by more than 150 equipment builders

Producing rock and crushed stone for America's gigantic road-building program is a slam-bang operation that calls for rugged equipment with plenty of get-up-and-go.

It's a "natural" for General Motors Detroit Diesel engines because these compact, quick-accelerating two-cycle Diesels outwork other engines—both gasoline and Diesel—on any job from 30 H.P. up.

This fact—plus world-wide service availability—explains why more than 150 manufacturers install GM Detroit Diesels in over 1000 different applications of power machinery.

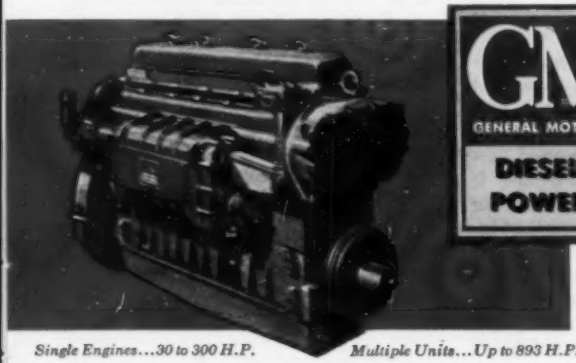
These dependable Diesels are the choice of pit and quarry operators in portable air compressors, dredges, rock crushers, shovels, scrapers and other heavy hauling units.

Your nearby distributor or dealer welcomes the opportunity to show you the savings you can make with GM Detroit Diesel power on *your* job. It's America's First Choice Diesel *because it does more work at less cost!*

SEE OUR EXHIBIT AT THE ARBA ROAD SHOW, CHICAGO, JAN. 28 TO FEB. 2

# of pits and quarries?

Shown above: Pioneer Portable Rock Crushing Plant; Bucyrus-Erie shovel; Koehring Dumptors; Chicago Pneumatic rotary compressor; Joy rotary drill; Wooldridge "Cobrette" scrapers; Lorain clamshell. Write for list of over 1000 power applications.



Single Engines...30 to 300 H.P. *Multiple Units...Up to 893 H.P.*

DETROIT DIESEL

Engine Division of General Motors
Detroit 28, Michigan

Regional Offices:
New York, Atlanta, Detroit, Chicago, Dallas, San Francisco

In Canada:
GENERAL MOTORS DIESEL LIMITED, London, Ontario

America's First Choice Diesel Engine

• **AED's Convention Committee and Executive Officers at a recent conference at the Association's Chicago headquarters where they are pictured working on plans for the 1957 Annual Meeting to be held January 27-30, 1957, at the Conrad Hilton Hotel in Chicago.**

AED's Chicago Meeting to be "Biggest"

A record-breaking attendance of more than 3,800 distributor and manufacturer members from every section of the United States, Canada and U. S. Territories will be found on hand for the four-day event.

THE 38th Annual Meeting of Associated Equipment Distributors on January 27-30, 1957, at the Conrad Hilton Hotel in Chicago, will be the biggest convention in the history of the association.

High on the list of subjects to be discussed are distributor-contractor relations and the problems of equipment financing, which today are among the most highly talked about topics in the industry. Sessions are planned to help members brush up on methods of improving their business operations, provide a forum for discussion of problems, and review recent developments and progress made throughout the industry. The convention will also feature an array of distinguished speakers.

Something new has been added to the '57 convention. More than 100 manufacturers of construction equipment and accessories will place their products on display at a special Conference, Display and Exhibit Center to be held in the exhibition halls of the Conrad Hilton Hotel.

The "Meet Your Manufacturer" sessions, a popular feature of past meetings, have been discontinued this year due to the participation of most manufacturers in either this exhibit or the ARBA Road Show.

Business sessions will again feature the Local Group Clinics, where officials of local distributor associations will get together for an informal exchange of ideas for useful and constructive programs.

The social calendar offers a well-rounded program sparked by good entertainment. The Early Birds' Breakfast, on opening day, will honor outgoing AED president Stan Laskey, of Northwestern Equipment, Inc., Fargo, N. Dak. Other events include the Welcoming Luncheon, and the Association's 38th Annual Birthday Party, which will include installation of new national officers.

There will be a special headquarters for the ladies as well as a host of activities and entertainment features.

Directing the planning and arrangements for the AED meeting is a six-man convention committee headed by R. F. Newlin, Newlin Machinery Corp., Kansas City, Kans. Working with Newlin are: L. P. Deephouse, Deephouse Equipment Co., Berlin, Conn.; P. M. Moninger, Capital Equipment Co., Richmond, Va.; Don F. Nickel, Don F. Nickel Equipment Co., Grand Rapids, Mich.; W. A. Patterson, Richards Equipment Co., Waco, Texas; and C. C. Tambornino, The George T. Ryan Co., Minneapolis, Minnesota.

AED men in picture

Clockwise around the table, are: L. P. Deephouse (back to camera), Deephouse Equipment Co., Inc., Berlin, Conn.; W. A. Patterson, Richards Equipment Co., Waco, Texas; P. M. Moninger, Capital Equipment Co., Richmond, Va.; W. G. Bowman, AED Convention Manager; R. F. Newlin, Chairman of the Convention Committee, Newlin Machinery Corp., Kansas City, Kan.; (standing) Stan Laskey, AED President, Northwestern Equipment, Inc., Fargo, N. D.; J. W. Schoen, LeTourneau-Westinghouse Co., Peoria, Ill., member of the Manufacturers' Convention Subcommittee; C. C. Tambornino, The George T. Ryan Co., Minneapolis, Minn.; Jack Ranle, AED Field Secretary; D. F. Nickel, Don F. Nickel Equipment Co., Grand Rapids, Mich.; Frank Skidmore, AED Director of Industry Relations; and L. Minor Doolen, AED Exec. Vice President, Telford Equipment Co., Lansing, Mich.

DISTRIBUTORS TO HOLD OWN MACHINERY DISPLAY

Associated Equipment Distributors has arranged for more than 100 manufacturers of construction equipment and accessories to place their products on display at a special Conference, Display and Exhibit Center—termed "Condex" for short—to be held in the Conrad Hilton Hotel exhibit halls during AED's 38th Annual Meeting.

Covering some 40,000 square feet of exhibit space, "Condex" will open on Sunday afternoon, January 27, and will run through Wednesday evening, January 30, when AED's convention will adjourn. Meanwhile, the American Road Builders' mammoth Road Show will be in progress at the International Amphitheater during the entire week (Jan. 28 through Feb. 2). By agreement, only AED manufacturer members not participating in the Road Show itself will display their products at "Condex."

According to association spokesmen, this innovation will not in any way detract from the usual concentration on business problems and individual distributor-manufacturer conferences for the 3,800 AED members already registered for the convention. "Condex" will be open only during afternoon and evening hours, when AED sessions are not in progress.

However, it is expected to serve an important purpose in supplementing manufacturer-distributor contacts at the AED meeting and at the Road Show, and to prove a high point of interest for the vast throng of equipment-conscious delegates who will be in Chicago during this all-important week.

ords of the contractor and to interview his men during working hours.

Stipulations which are of importance to the contractor include the following:

1. Minimum rates, as determined by U.S. Department of Labor, must be paid, though no guarantee is made that laborers can be obtained.
2. Such rates are exclusive of "fringe benefits."
3. Only those classifications listed may be used and new rates must be determined for unclassified crafts.
4. Wages must be paid weekly with the approved deductions.
5. Wage schedule must be posted on the project.
6. The state highway department may withhold funds due contractor to insure restitution of unpaid wages.
7. Certified payrolls must be filed every week and subject to inspection.
8. No one can be employed as an apprentice unless he is employed as a part of a regular program.
9. Contractors must make the stipulations and predetermined wage scale a part of all subcontracts.
10. Violation of stipulations will be cause for contract termination.
11. Violators may be "blacklisted" on all Federal work.

Swamp Filling Methods

(Continued from page 71)

of soils problems and calling for experienced personnel on construction. The final lessons pointed to are that each area requires individual attention, and that seasoned judgment by the engineers and contractors can save much time and money in meeting the inevitable emergencies and the changing conditions that arise in swamp work.

Dillon Geiger is chairman, Albert J. Wedeking, executive director and Herman D. Hartman, chief engineer of the Indiana Toll Road Commission. The toll road project is under J. E. Greiner Company, general consultants.

Editor's Note: The Editors express appreciation to H. A. Harnden, project manager and G. O. Kerkhoff, chief soils engineer for J. E. Greiner Company, soils engineers W. K. Taylor, Harold Shaffer and Kent Allemeier, and also to representatives of the contracting engineers and the contractors, for their help in compiling and checking the details contained in this field report.

Detroit Diesel to hold service training sessions

A series of one-week training sessions covering the design, operation and maintenance of Detroit Diesel two-cycle engines was scheduled to be started January 14 at the General Motors Training Center in Atlanta, Georgia. Similar sessions will be held during the year in GM Training Centers in Denver, Colo., and San Leandro, Calif.

Manned by factory instructors, the sessions will be open without charge to all owners and operators of diesel-powered equipment. Arrangements to attend may be made with any Detroit Diesel distributor or dealer. According to H. J. Vaughn, the division's director of service training, the courses will include practical training in trouble shooting, tune-up, overhaul and preventive maintenance with trainees working on live engines and sub-assemblies throughout the course.

The Atlanta schedule is as follows: Series 71 industrial engine, the weeks of January 14, 21, 28, February 11, 25, March 4, 18 and April 1. Sessions on the division's 6-110 and 51 models will start the weeks of February 4 and March 11, respectively.

OUR COVER SCENE

Since Roads and Streets published the first nationally circulated article on the "supercolossal" highway cut of 8.5 million cubic yards (May '56) as part of the spectacular U. S. 40 relocation in the San Francisco Bay area, this project has received a great deal of publicity.

But many of the interesting problems and aspects have never been published. A forthcoming progress article will take the readers on another trip through this tremendous project.

Meanwhile, here on the cover page is a photo snapped by the Editor when he visited this job a few weeks ago. The great cut will take form largely beyond the natural amphitheatre seen in the middle background. Ferry & Crow, the contractors, are presently hauling out of the big cut with an extensive fleet of Caterpillar DW20 scraper units, some of which are employing LeTourneau LU scrapers in tandem.

Seen in the foreground is a progression of filling operations—dropping scraper loads, initial dozer spread, sheepsfoot rolling, blade turnover and final laying out, final rubber-tired compaction, and sprinkling to maintain proper moisture. This fill of 1.4 million cubic yards will be 140 ft. deep when completed. Filling during November was proceeding on a 4,500 ft. one-way haul at a steady rate of 30,000 cubic yards per day of two 7-hour shifts. Following a brief winter shutdown because of wet soil, the projects operation will be continued throughout 1957.

Pennsylvania Builds its First

Continuously Reinforced Concrete Pavement

THE first section of continuously reinforced concrete highway in Pennsylvania—a 2-mile segment of dual-lane highway four miles north of York, Pa., on Route 111—has been completed. Concrete work started September 18 and the last pour was made October 19. H. J. Williams Company, York, Pa., was the contractor.

Special deformed reinforcing mats give extra strength to this 9-in. thick pavement on the York Expressway; they replace the contraction and expansion joints and standard reinforcing steel normally used in highway construction. The mats—16 ft. long and 6′ 2″wide—weigh 185 lb. per 100 sq. ft. They were laid 4½ in. below the surface—at mid-point of the slab. Mats are overlapped 12 in. at each end, 8 in. along the sides.

Bar mats were fabricated by Bethlehem Steel Company, of seven No. 3 (⅜-in. dia.) transverse bars and ten No. 5 (⅝ in. dia.) longitudinal bars. Where longitudinal and transverse bars cross, clips are used to bind them. Clips are also used to join adjacent mats.

• The pavement bid price for the job represented a cost of $5.47 per lin. ft., compared with estimate of $5.75 for standard construction. In laying the continuously reinforced section, the Williams Company found that the work proceeded faster, and that laying operations were closer together. The processing occurred largely within 200 ft., whereas in standard construction, laying operations are generally stretched over a much greater distance.

Hair Cracks Form

With 0.5% of steel in the cross section of the concrete slab, it is known that hair cracks will form in the concrete about every 6 ft. The steel, however, holds these cracks so tightly that neither water nor dirt, in dangerous quantities, can get into the concrete.

If water doesn't get through the cracks, explains a Bethlehem engineer, the subgrade remains relatively dry, "pumping" action does not occur, and the subgrade retains its ability to support the slab. If no dirt gets into the cracks, there is no chipping of the concrete and no damage results from the compression of the slab when temperatures rise.

In addition to these known advantages, the Bethlehem spokesman further noted, highway officials believe that continuously reinforced highway will prove cheaper to install and result in much lower maintenance costs. Standard thickness of concrete in present day heavy-traffic highways is 10 in. By using twice as much reinforcing steel, in the form of mats, it is expected that the thickness of the slab can be safely cut to 7 in., resulting in an over-all lower initial cost. The elimination of standard highway joints, and the costly sealing they required, will cut maintenance costs of continuously reinforced highways to a minimum.

• In conjunction with the laying of the continuously reinforced stretch of Route 111, the U. S. Bureau of Public Roads, the Pennsylvania department of highways, and the American Iron and Steel Institute have contracted with Lehigh University, Bethlehem, Pa., to test and evaluate the installation. It is expected that these tests will aid highway engineers in the development of a roadway smoother and more economical to build than those existing today. The Lehigh testing will include measuring of stresses in both the concrete and steel by resistance-type gages.

The decision to install the section of continuously reinforced concrete highway was made by Joseph J. Lawler, Pennsylvania secretary of highways, and Robert A. Farley, chief engineer in charge of maintenance.

• Following the lower 4½-in. strike-off of concrete, a 16′ x 6′2″ deformed bar mat is put in place in lieu of the customary welded wire reinforcement. A notable experiment, which Pennsylvania highway engineers will study closely for durability and economic data.

Maryland road program cost estimated higher

Three years ago when Maryland's 12-year highway road program was launched with much publicity, the price tag was given as $568,225,000. Today, it is expected that this program will cost $950,264,000.

As explained by Roads Commission Chairman Robert O. Bonnell, the big increase comes from several sources. One is the additions to the program voted by the State Legislature. Another is the general rise in construction prices. And third is the raising of design standards to meet requirements of the new Federal highway program.

Private Enterprise at its Best

NO SEGMENT of industry so well epitomizes the American spirit of private enterprise and initiative as highway contracting. The thousands of companies which make up this multi-billion-dollar "industry within an industry" are typically headed by old fashioned individualists. Everywhere you turn you see these firms grown prosperous through the two-fisted determination of men who began small and have thrived on matching their wits in free competition.

Truly it is the contractor who will finally carry the ball and get the expanded highway program geared to the unprecedented pace set for it. It is because of his pivotal importance that ROADS AND STREETS has spotlighted him in this issue. On the occasion of the 1957 Road Show, we have attempted to paint a fresh portrait of this elusive fellow.

Road contractors traditionally are self reliant men who often got their start out on construction jobs, where softies don't last long and where a man expects to sweat and eat dust in summer, repair tractors out in the winter wind if necessary, and overcome obstacles in stride. Physical difficulties are their stock in trade, as are the risks inherent in outdoor construction involving constantly changing soils, rocks and weather. Time and again the contractors, through their associations, have reaffirmed their insistence on the privilege of assuming these risks, as being basic to free enterprise.

● To this extent the contractor asks no quarter. But in another area, he asks and needs the best help that state legislatures and the highway departments can give him. First of all, the contractor asks for an orderly, year to year flow of jobs on which he can bid. Now that federal financing has been placed on a long-range basis, there is no excuse for a continuation of feast-and-famine award schedules, such as have plagued contractors in a good many states in the past.

The contractors in planning their own equipment investment and personnel programs on a long-term basis, can achieve greater efficiency and lower costs. Which means closer bids and more road construction from the available funds.

The contractors asks, furthermore, that more lettings be scheduled during autumn and early winter, so that they can get started earlier in the spring. In each state, there is a best pattern of letting dates that will serve the mutual interests of the contractor and the highway department. The recent custom of placing the most jobs during the second quarter—when a contractor should already be out there working—has cost the taxpayers money in forced inefficiency.

Lest any of us forget, the contractor's ability to cut costs is dependent first of all on his ability to get the maximum number of days of work per year out of his equipment. A tractor worked half the season is not making anybody any money.

● The contractor in some states still needs clearer specifications, although much has been accomplished in this respect. He'd like more results-type specifications, especially in earthmoving. Such innovations as lump-sum or per-mile bidding will help him cut costs on secondary projects. He'd like to move his equipment over the roads with fewer restrictions. He'd like to know that right-of-way delays won't hold up his work, once he's started, and that utility company cooperation will be prompt in avoidances of delays.

He'd appreciate more standardized equipment requirements—the same sheepsfoot rollers OK on both side of the state line, for example.

Everyone, of course, is mindful that the highway departments have a staggering task. They must double the flow of construction jobs and do so quickly despite a desperate shortage of engineers. The main thing there is to keep the state highway department's work in proper perspective. Its years of effort in making needs studies, surveying routes and locations, and getting out the construction plans—all of the long and complex advance work for a given project or year's program is *merely so that the contracting industry ca ntake over.*

In a real sense, the measure of a highway administration's success is its ability to remove roadblocks, and clear the way for private enterprise to do its very best. If this fact is never lost sight of, the big road program which looms ahead will be not only history's greatest public works program but also history's greatest peacetime achievement in government-industry cooperation.

—Harold J. McKeever

Macks ARE HANDLING THE IMPORTANT JOBS

building the National Highway System!

The road boom's underway! Up to 33 billion dollars worth of new highways to be built. And right now, you're probably asking yourself:

"What kind of hauling equipment will net me the greatest return?"

For the best answer . . . ask any of the thousands of construction firms that have learned to rely on Macks. They'll tell you that their best investment is the kind of equipment that can handle the most punishing loads over the worst terrain and footing without losing precious contract hours for overhaul or repair.

And they'll tell you—*Mack's got it!* Got it in the powerful dependability of the famous Mack engines. Got it in the famous Mack Balanced Bogie with the exclusive Power Divider that allows Macks to move in and work where other trucks bog down. In the many, many other features that have made "Built like a Mack" a trade term for the utmost in stamina, dependability and strength.

Best of all—there's a Mack for every important hauling job. Take a look soon at the Mack 4- and 6-wheel haulers, dumpers and concrete-mixer models . . . with capacities up to 34 tons. You'll quickly see why, wherever you see important work, you'll generally see Macks in action. Mack Trucks, Inc., Plainfield, New Jersey. In Canada: Mack Trucks of Canada, Ltd.

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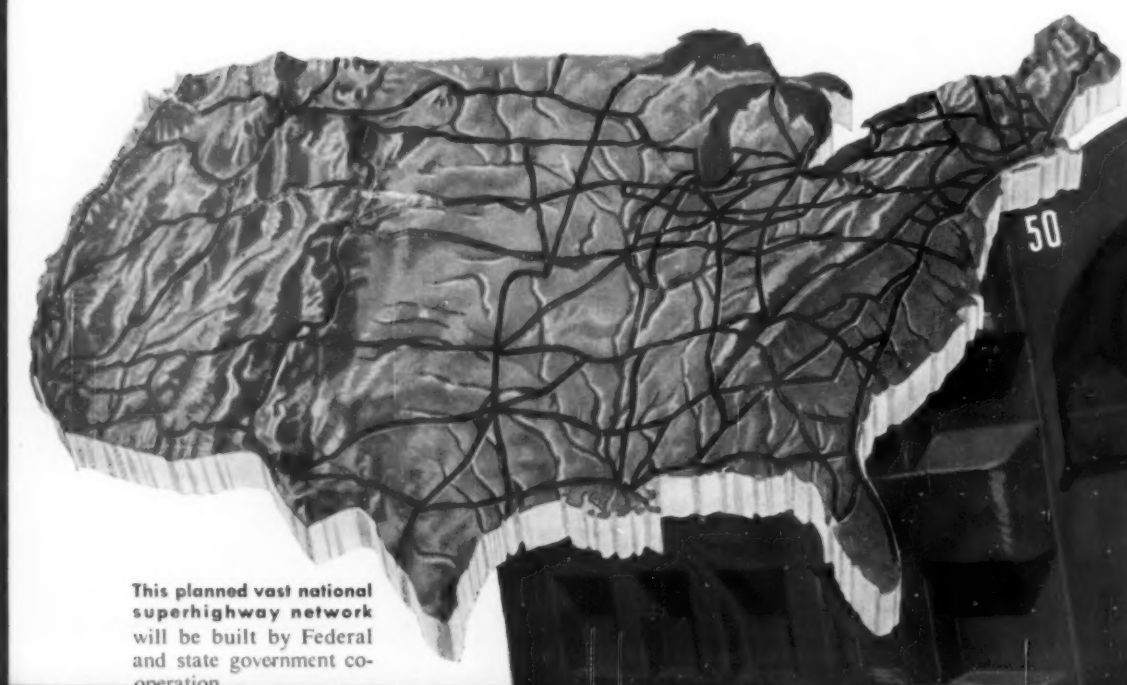
FIRST NAME FOR TRUCKS



This planned vast national superhighway network will be built by Federal and state government co-operation


B63 Mack
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woody

and state government co-operation

Typical Leaders

Some of the contractor personalities whose vigor and leadership have helped the road building industry progress.

Edward O. Earl . . . San Xavier Rock and Sand Co., Arizona; Chairman, AGC's Highway Contractors' Division.

Frank Mashuda . . . earth mover and turnpike builder who heads Wisconsin firm bearing his name.

The Highway Contractor

"Man of the Hour"

An informal fresh look at the American roadbuilding contractor, his problems, industry patterns and outlook—and the help he needs as he rolls up his sleeves for the expanded highway program.

John P. Moss . . . of Moss-Thornton Co., Alabama; President ARBA Contractors Division, crusader for better earthmoving specifications.

A Roads and Streets Staff Industry Review

"HARVEY, we left $83,720 on the table this morning."

These words, spoken by a contractor to his partner, epitomize the eventful and sometimes harrowing life of the men who will build all these billions' worth of new highways in the next decade.

These risk-takers, of which more will be said, are of the industry which with little fanfare completed the 236-mile Kansas Turnpike in two years—the 112 firms and their subs which handled 50 million cubic yards of earthmoving, 12 million tons of crushed aggregates, 6.7 million square yards of high-type paving, 236 bridges and all the rest.

These businessmen, which more fairly describes road contractors today, are also of the clan which

A. H. Blank . . . of Pennsylvania Asphalt Paving Co.; president Associated Pennsylvania Constructors during past year.

George C. Koss . . . another AGC past-president, head of Koss Construction Co., Iowa, leading concrete highway paving specialist.

D. W. Winkelman . . . Past-president of AGC; heads D. W. Winkelman Co., New York state; large turnpike and airfield builder.

made it in two years on the 141-mile Indiana toll road, just opened to traffic, where one contractor alone threw 365 pieces of equipment into the race.

The multi-million-dollar toll roads recently finished or under construction in Connecticut, Massachusetts, Florida and other states further spotlight the speed and efficiency with which the American contracting industry can marshall men and machines and produce materials to construct a modern highway. All these toll roads were jobs decades in the planning—taking years for study, traffic analysis, route location, right-of-way proceedings, legislative debate, programming, public hearings, financing struggles and final plan preparation.

But, in every case, when these jobs reached the construction stage, things moved fast. No one was worried about the ability of the contractors to meet the production schedule.

Today, the capacity of the highway contracting industry is the brightest hope of officials charged with translating the new federal funds into modern highways for an expanding automotive age. The American Road Builders' Association, after a thorough study of the industry's strength, convinced Congress of the contractor's ability to absorb a doubled, even a tripled, work load. The 13-year construction program is expected to accelerate slowly from this year's $5.4-billion volume to a peak of $8 billion in 1956. Contractors could handle a peak of $11 billion within that period, ARBA discovered.

Little Known Businessmen

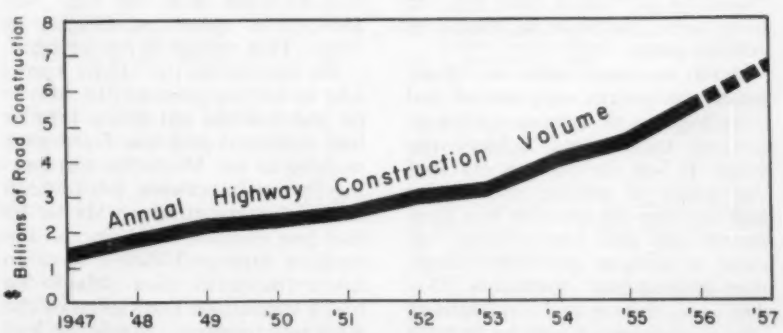
In spite of the barrage of publicity about new highways over the last ten years, the man who builds them seldom makes the headlines. He is a relatively unknown businessman.

The skyscraper contractor's operation may be a noon-hour spectacle for "sidewalk supervisors," but the highway contractor's work is almost always done with little public attention. The taxpayer votes funds for the project and thereafter, until the job is finished, he is detoured around it. The American roadbuilder, one of the most hustling, aggressive personalities in our free enterprise system, is frequently an anonymity.

As the 13-year National Highway Program moves into the construction stage, however, he is moving into the limelight. As billions of dollars are poured into an attempt to complete a 41,000-

NOTE: Special credit for this review is due Duane L. Cronk, our Washington Editor, who took the lead in a pioneering assignment. There is a surprising lack of uniform annual statistics on the firms participating in the state highway programs, trends in payments to contractors, and other market data which would seem to be vital. No government figures exist on the local firms and specialists, numbering many thousands, who do highway or street work but are not state-accredited. Our expanding industry needs such facts for better planning. —Harold J. McKeever.

Road Building's Long Postwar Climb Continues



Showing dollar volume of highway and street construction, which has gained without interruption and quadrupled since 1947.

mile modern interstate network, renovate a 700,000-mile existing arterial system, further improve 2½ million miles of back roads, and spruce up aging urban street gridirons, the contractor becomes "The Man of the Hour."

Where did he come from? How does he operate? How capable is he of handling a market that may double within three years? Is he a "gambling fool" or a shrewd student of the "calculated risk?" How competitive is the business today? How specialized? What are the patterns of subcontracting? How much of the market do "the big fellows" pick up?

These are a few of the questions we would like to probe in this special feature, a resume of what the road contractor today is like, what he does, and where he is going.

And even more important today—what can be done to make his job easier, to create a climate for high productivity, and thus help him to translate a multi-billion dollar scheme into more and better highway miles? How can state highway departments help contractors to hit a high production stride in a hurry?

A NEW BUSINESS

Compared to many American industries, highway contracting is a relatively new business activity. Until 50 years ago, very little roadbuilding was accomplished by private enterprise. Almost all roads were local roads—constructed and maintained by county or city highway department forces. In some counties, farmers were allowed to spend a number of days each year "working out" their road tax. In other areas, the roads were built by convict gangs.

After the auto came in, "good roads" campaigns were started and state highway departments were organized to develop highway systems. It was during this era that the policy of seeking competitive bids for new construction was hammered out and roadbuilding became a unique government-engineer-businessman operation. Today, state, county and city highway officials seek sealed bids for 98% of the road and street improvements to be built each year. Uncle Sam requires that all jobs on which federal grants are used to be accomplished by the contract method. Once it was lifted out of the realm of force-account labor patronage, highway construction evolved spectacularly into a high-speed mechanized production process.

The popularity of the contract system for highway construction stems from rather simple economic advantages. The public agency can obtain a road built to its specifications, for a predetermined price, and pass on to private industry all the burden of actual construction as well as the risks of bad weather, materials shortages, and other unforeseen elements. The contractor calculates the job and the risks and bids for a chance to complete it at a profit.

The contractor has welcomed these challenging risks. "We're all gamblers," a Massachusetts roadbuilder declares. "We bet that there will be only 10 days of rain during the job, that cement will cost only so much a barrel 18 months from now and that there won't be any more rock than the plans indicate.

"We estimate what the job will cost us. Then we try to *guesstimate* what the competition figures it will cost *him*. If it looks like we will be under-bid, we may hack off a percentage to stay in the running. If we enjoy a strategic advantage, we may hang on a few hundred dollars for gravy . . . and keep our fingers crossed. If we win more often than we lose, it's as much luck as anything else."

The range of bids on the average job would seem to bear that out. Of six bids submitted for a 1.4-mile bituminous job in Vermont, picked at random last month, the low bid was $279,689 and the high was $360,993—a spread of $81,304 or 29%. This spread is not unusual.

No one except the bidder knows why he bid the price he did. Maybe he had lost the last dozen jobs he had estimated and was faced with nothing to do. Maybe he was looking for an in-between job to keep his equipment rolling. Maybe he had just finished a job in the immediate area and didn't have to figure "move-in" costs. Maybe he had a specialized knowledge of the job's requirements. Maybe he had figured out a way to do the job faster. Maybe he wanted to expand into that area or in that type of operation and was willing to complete the job at near cost to establish himself. Maybe he had a good safety record and could eliminate thousands of dollars from his bid because of the lower insurance rates he enjoyed. Maybe he had just estimated too low, an error of judgment.

THE CALCULATED RISK

Some contractors still turn purple if you refer to them as gamblers. To these men, sound estimating is the difference between success or failure. It is true that the average contractor will spend many days or weeks estimating a job he may never get. In fact, bond writers believe that if a contractor is obtaining more than 10% of the jobs he bids on, he is figuring too low for his own good. On a big project the firm's staff may comb over plans and specifications, "walk the line," sleuth for borrow and aggregate sites, painstakingly gauge haul distances, labor rates, move-in costs, and all the other cost factors.

There the tangibles cease and the intangibles begin. After he has estimated his costs, he has to weigh his competitor's strategic advantages as well as his own.

On top of that, in some states, he must bid, not only against the competition but against the state highway department. If the low bid is not within 10% of the department's own estimate, all bids can be thrown out.

If the job goes as well as he had hoped, the low bidder makes a profit. He always entertains the hope of doing better than he expected.

In a southern state recently, the highway engineers reported that aggregate would have to be hauled in for the paving operation, at costly shipping rates. One more enterprising contractor, however, scouted the locality and discovered a good source of acceptable material. He bid low, took the job, and "made a killing."

The losses—the jobs that go sour—sneak up on experienced contractors as unexpectedly as the "windfalls." The trade still recalls the pre-war turnpike job where the contractor, after basing his estimate on engineers' test borings, found the hardest kind of rock instead of soft sandstone and nearly went broke while he ran two shifts, wearing out a thousand drill bits a day.

STATE HIGHWAY CONTRACTORS AND CONTRACT MARKET DATA

As compiled by Roads and Streets, December, 1956. Included work with and without federal aid. Does not include the many thousands of contractors, large and small who are not on state qualification lists but who participate in county, local and urban road, street and bridge work or subcontract state jobs. Also omits firms not bidding because of other work in progress.

State	Number of State Highway Contractors Awarded Contracts 1952	Awarded Contracts 1956	Increase	Prequalified 1956	Paid to State Road Contractors 1952	1956
Alabama	....	109[1]	...	269	$	$ 54,900,000[10]
Arizona	....	73	...	73		20,500,000
Arkansas	57	76	49%	171	18,732,000	22,154,000
California	172	307	78%	812	99,600,000[1]	209,700,000[1]
Colorado	40	41	...	135	14,379,000	26,500,000
Connecticut	....	97[2]	...	274	12,036,000	16,000,000[2]
Delaware	19	21	11%	57	6,200,000	7,350,000
Dist. of Columbia	37[3]	34[3]	—7%		4,400,000	6,467,000
Florida	63	83	32%	249	48,678,000	85,000,000
Georgia	....	66	...	253	30,236,000	34,774,000
Idaho	....	71[3]	...	250	10,763,000	19,800,000
Illinois	188[3]	206[3]	10%	457	60,019,000	72,769,000
Indiana	89[3]	85	—3%		30,003,000	29,930,000
Iowa	....	25[3]	...	426	55,610,000	76,500,000
Kansas	112	126	12%	282	26,786,000	41,000,000
Kentucky	135	141	3%	300	28,983,000	31,673,000
Louisiana	113	115	2%	69	32,973,000	66,403,000
Maine	75	80	7%	77[8]	5,030,000	10,450,000
Maryland	....	51	...		22,000,000	46,000,000
Massachusetts	80	110	...	110	40,000,000	70,000,000
Michigan	130	160	23%	318	60,855,000	137,642,000
Minnesota	90	80	...	175	39,579,000	47,550,000
Mississippi	40	40	...	264	20,388,000	20,288,000
Missouri	93	108	13%	283	36,000,000	50,000,000
Montana	....	54[3]	...	158	10,230,000	16,345,000
Nebraska	93[6]	135[6]	45%	210	13,473,000	27,000,000
Nevada	23	23	0	71	5,819,000	9,530,000
New Hampshire	42	44	5%	100	660,000	7,811,000
New Jersey	33	28	—17%	240	21,208,000	23,823,000[1]
New Mexico	20	25	25%	72	14,500,000	37,150,000
New York	230[5]	178[5]	—30%		109,600,000	116,100,000[4]
North Carolina	90	103	14%	164[7]	42,000,000	47,000,000
North Dakota	31	56	81%	129	14,200,000	20,000,000
Ohio	122	199	61%	645	53,378,000	110,000,000
Oklahoma	....	97[3]	...	178	31,400,000	35,000,000
Oregon	153	157	3%	510	30,800,000	27,000,000
Pennsylvania	185	173	—7%	153[8]	87,967,000	60,787,000[9]
Rhode Island	9[3]	14[3]	55%	52	7,000,000	12,000,000
South Carolina	66[3]	81[3]	23%	208	15,990,000	19,136,000
South Dakota	....	82[3]	...	181	12,845,000	25,500,000
Tennessee	....	73[3]	...		17,500,000[1]	49,800,000
Texas	....	168[3]	...	303	86,580,000	(est) 100,000,000
Utah	40	27	—33%	110	3,700,000	10,752,000[1]
Vermont	....			71	.....	7,400,000
Virginia	157[3]	165[3]	5%	407	27,550,000[1]	42,390,000
Washington	....	112[3]	...	432	32,000,000	47,000,000[9]
West Virginia	....	57[3]	...	191	16,565,000	18,600,000
Wisconsin	117	160	37%	327	25,660,000	65,000,000
Wyoming	....	50[6]	...	130	10,000,000	16,000,000
Total	Incomplete	4,454		10,351	$1,389,475,000	$2,148,007,000

(1) Fiscal year.
(2) Includes state trunkline projects only.
(3) Holding jobs during year.
(4) Awarded during year.
(5) Through September 27 only.
(6) Active bidders during 1956.
(7) Including 46 house movers.
(8) Prequalification not required. Number of bidders, sworn statement required with bid.
(9) To November 1, 1956.
(10) Total construction expenditures.

"NATURE OF THE BUSINESS"

That's the nature of highway contracting, and to a great extent it will always be that way.

Perhaps the risk inherent in contracting explain the highly personal management which often prevails. The average contracting firm today exists in the shadow of one man, its founder. Probably no other business is based more on personal know-how, stamina and resourcefulness. By far, the majority of firms active today are still managed by the originator or his sons.

An analysis of the membership of the Michigan Road Builders' Association by Executive Secretary C. J. Carroll reveals that at least 82 out of its 124 member firms are managed by one man, a family partnership or a family corporation.

The balance of the membership is made up of 12 partnerships and 30 corporations.

Of 253 firms on Georgia's prequalified contractor list, 34% are "one-man shows" and 14% are partnerships.

THE CONTRACTOR'S "MARKET"

For every multi-million-dollar project, there are hundreds of smaller assignments—routine, frequently messy, usually uninspiring, but still necessary in the road or street scheme.

Together, these jobs added up to $5.4-billion production volume in 1956—up $0.8 billion from 1955, quadrupled (in dollars) since 1947, and heading on upward. The best guess for 1957 is $6 billion-plus, the plus dependent on the engineering get-ready.

The contractor's flow of prospective road jobs comes from many sources. The recent boom of 37 toll roads accounted for 21% of this output at its peak. The bulk of his prospects, however, has come out of the 48 state highway improvement programs. Aided by federal grants, state highway departments have been jacking up their contract lettings, year by year. The remaining chunk of the road-building market flows from county road commissions, city public works departments and other local agencies.

The conglomeration of all these lettings is the potpourri of projects for which the nation's 6,700 accredited state road contractors compete, along with additional thousands of local contractor and subcontractor firms whose names appear on no formal lists. In any one year, the government agencies within the road contractor's sphere will variously seek bids for long rural projects permitting all-out production, for complicated urban expressways requiring custom-planned operation; for low-cost county bridges and multi-million-dollar river crossings; for new street repairs, alleys, parking lots and shopping centers.

The industry takes these jobs in stride. For every contract offered, half a dozen contractors on the average come forward to study the requirements and submit their bids. The sum of their efforts last year added up to 55,000 miles of road and street improvement or reconstruction.

The American Road Builders' Association recently estimated that the highway contractor directs a labor force of 240,000 men, a figure which will nearly double under the National Highway Program. He manages an equipment fleet of 330,000 major units, including such machines as 42,000 bulldozers, 16,500 cranes and shovels, 2,300 stone crushers and 97,000 trucks, representing an investment of $3 billion.

Contract roadbuilding got its start in the early 1900's. Because construction in those days was simply a matter of scraping earth out of the roadbed, hauling rock in and compacting it, anyone with a mule team could compete for the work.

The early enterprisers who came forward to bid on these jobs trickled out of many occupations. In Minnesota, the lumberjacks brought their teams out of the woods to tackle gravel hauling and spreading jobs. In Ohio, it was brick yard operators whose teams and teamsters were temporarily idle. In New England, more than one farmer took on a road job to get away from the drudgery of chores and decided to stay with the business. In the West, the decline of railroad construction sent many dirt movers into highway work.

- S. J. Groves, who founded one of the largest road firms in business today, switched from digging out basements in Minneapolis when the federal-aid highway program gave him state in road work in a big way.

- J. S. O'Connor of Indiana, got his first taste of construction as water boy for a railroad gang. In business for himself, he moved gradually from railroad work to highway construction.

- Nello L. Teer saw his father fail on his first road project and promptly hired the idle mule teams to tackle a few earth moving jobs himself. He had 350 mules working for him in the 1920's before he decided to mechanize.

- Grandview Construction Corporation, one of the most aggressive firms in the east, was prominent in the nursery and landscaping field before going into highway earthmoving.

- W. G. "Big Bill" Cook of Jackson, Miss., was a banker with a Master's degree from Columbia

These Firms Roam Several States

Among the contractors which have recently had state highway or toll road projects in three or more states.

Guy F. Atkinson Co., San Francisco, Calif.
Arcole Midwest Corp., Evanston, Ill.
Bates and Rogers Construction Corp., Chicago.
Blythe Company, Charlotte, N. C.
Concrete Materials & Con. Co., Cedar Rapids.
Condon-Cunningham, Omaha, Nebr.
Construction Aggregates Corp., Chicago, Ill.
Dravo Corporation, Pittsburgh, Pa.
R. P. Farnsworth & Co., Inc., New Orleans, La.
S. J. Groves & Sons Co., Minneapolis, Minn.(1)
Hardaway Construction Co., Columbus, Ga.
Harrison Construction Co., Pittsburgh, Pa.
Herlihy Mid-Continent Co., Chicago, Ill.
T. L. James & Co., Ruston, La.
J. A. Jones Constr. Co., Inc., Charlotte, N. C.
Al Johnson Construction Co., Minneapolis.
Johnson, Drake & Paper Co., Minneapolis.
Kansas City Bridge Co., Kansas City, Mo.
Peter Kiewit Sons' Co., Omaha, Nebr.(2)
C. J. Langenfelder & Son, Inc., Baltimore, Md.
Merritt-Chapman & Scott Corp., New York.
Morrison-Knudsen Co., Inc., Boise, Idaho
B. Perini & Sons Co., Framingham, Mass.
Nello L. Teer Company, Durham, N. C.
R. B. Tyler Co., Louisville, Ky.
Union Building & Const. Co., Passaic, N. J.
Warren Bros. Road Company, Cambridge, Mass.(3)
Western Contracting Corp., Sioux City, Ia.(4)
D. W. Winkelman Co., Inc., Syracuse, N. Y.(5)
Winston Bros. Co., Minneapolis, Minn.

Note: Firms such as American Bridge Division of United States Steel Corp., Bethlehem Steel Co., Armco Drainage and Metal Products, and Raymond Concrete Pile today are represented in, qualified or active in virtually every state often in combined role of steel supplier, fabricator and erector.

(1) Heavy grading jobs in 11 states.

(2) Tops list with 50 jobs current in 1956 in 17 states, totaling $30.5 million.

(3) Company and its subsidiaries active as asphalt specialists in 17 states.

(4) Terminated highway jobs in 5 states in 1956, 118 roadway-miles at $22.5 million.

(5) "The multi-state contractor," notes D. W. Winkelman, "can offer the construction industry a wide range of experience, enabling him to adjust to all types of work and conditions rapidly and economically . . . an established and efficient organization that can support any type of project with the equipment required . . . and one which can offer experience personnal in all phases. Such companies thus can expedite the purchase of materials, handling of labor questions and many other problems through regional-wide contacts, saving precious time and more precious dollars for all concerned. Winkelman's firm presently has work (predominently highway and airfield) totaling 22 projects in six states.

University. He was running a Ford dealership when the depression struck and left him holding a lot of paper on trucks sold to small haulers. So he completed their subcontracts himself and in the process discovered he liked construction.

• B. H. Hardaway of Columbus, Georgia, was a university professor who became interested in railroad engineering and eventually worked into contracting.

• C. J. Langenfelder was a farmer 50 years ago who went from hauling cord wood off his wood lot to cellar excavation and then to construction.

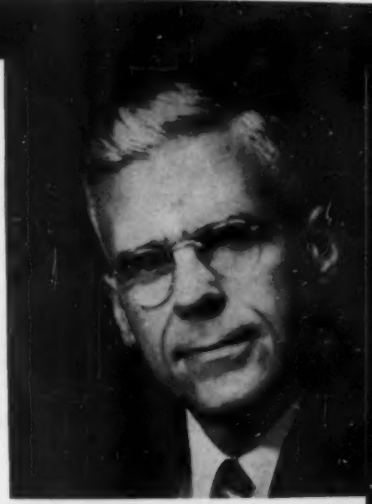
SURVIVED CHANGES

The contracting industry has matured significantly in the last 20 years. It is vastly more sophisticated, flexible and confident than the industry which mushroomed during America's first roadbuilding boom back in the 1920's. The firms that can trace their origins back even thirty years have seen and survived one sweeping change after another. In the 1920's, it was a mechanical revolution; in the 30's it was a depression; in the 40's it was a war; in the 50's, tough projects of unprecedented size, unpredictable costs, stricter specifications and cut-throat competition, plus a continuance of mechanical innovations.

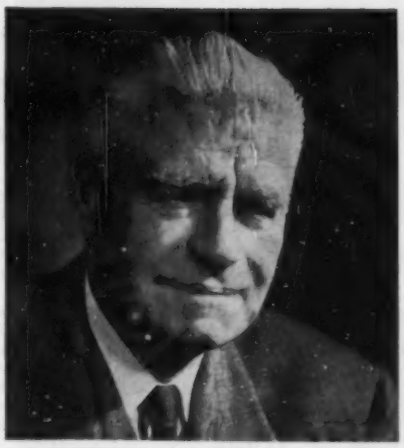
The depression taught contractors how to figure their costs to the nearest penny, how to trench in and fight a holding battle. The crash construction program of the war taught them another trick—how to expand hastily with a minimum of waste, how to finish jobs before "impossible completion dates," and how to "migrate"—leaping across state lines to bid on lucrative projects in their specialty.

The big toll road jobs completed this latter transformation, nourishing a breed of contractor who, equipped with a highly mobile fleet of machines, could bid on big jobs in many states and compete successfully with local firms. The great bulk of contractors, however, operate in a limited area where their knowledge of conditions (and requirements) reduces the gamble of both estimating and construction.

There is no "average" contractor. The range of company size, for example, swings from the small municipal contractor who accomplishes $50,000 worth of curb and gutter work a year (if he is lucky).



Peter Kiewit . . . of Peter Kiewit Sons' Co., Omaha. Firm handled $30.5 million in highway projects in 17 states in past year, as sideline to its atomic energy and other huge heavy engineering construction work, making it among "big six" in nation's roadbuilders.



H. W. Morrison . . . world-famed dam builder and head of far-flung Morrison-Knudsen Company, Inc. Had $14.5 million in road jobs in 1956. "If highway departments offer larger jobs we will probably expand our highway business," Morrison told Roads and Streets editor.

Louis R. Perini . . . President, B. Perini & Sons, Inc., of Boston. Another firm which has emerged as very large roadbuilder, integrating this work with tunnels, water conduits and other heavy construction. Had $24 million piece of New York Thruway, and more recently jobs on the Massachusetts Turnpike.

"Big Fellows" Will Play Increasing Role

to the multi-state operator who juggles a dozen or more projects at a time. Just as there is no average highway job, there is no average contractor.

An analysis of 691 firms replying to a recent survey reveals somewhat the strata of the industry. In 1955:

• 264 (or 38%) completed less than $250,000 worth of work.

• 108 (or 16%) —$250,000 to $500,000 volume.

• 112 (or 16%) $0.5—1.0 million.

• 176 (or 26c) —$1 million to $5 million.

• 31 (or 4%) —over $5 million.

It is such diversity in size that accounts for much of the industry's ability to soak up all kinds of highway contracts.

As in most industries, a score of "big operators" with apparently unlimited capacity dominate the large projects scene. Some of these are the giant general construction firms, builders of dams, power plants, air bases and other heavy

Some of Year's More Successful State Highway Bidders

(State highway department awards during 1956 calendar year)

State	No. Awards	Bid Total
FLORIDA		
Cleary Bros. Construction Co., West Palm Beach	3	$2,808,000
Cone Bros. Construction Co., Tampa	7	2,735,000
W. L. Cobb Construction Co.,	6	2,497,000
R. H. Wright & Sons Co., Fort Lauderdale, Fla.	3	1,922,000
IOWA		
Booth & Olson, Sioux City, Ia.	30	$5,197,950
Hallett Construction Co., Crosby, Minn.	24	3,153,360
Hargrove Construction Co., Cedar Rapids, Ia.	18	2,759,390
Fred Carlson Co., Decorah, Iowa	18	2,692,000
Concrete Materials & Constr. Co., Cedar Rapids, Ia.	58	1,573,900
Cameron-Joyce & Co., Keokuk, Ia.	9	1,439,900
A. Olson Constr. Co., Waterloo, Ia.	30	1,072,500
E. M. Duesenberg, Inc., Clear Lake, Ia.	7	1,073,480
Christensen Bros., Sioux City, Ia.	15	1,054,340
ILLINOIS		
Boyle & Co., Chicago, Illinois	7	$7,337,000
S. J. Groves & Sons Co., Minneapolis, Minn. (Includes one joint venture job with J. C. O'Connor	5	6,839,000
M. Hoeffken Co. & Hoeffken, Inc., Belleville, Ill.	7	5,825,000
O'Connor Construction Co., Springfield, Ill.	5	5,475,000
Allied Structural Steel Corp., Chicago	5	5,224,000
McDougal-Hartmann Co., Peoria, Ill.	7	4,082,000
Standard Paving Co., Chicago	4	3,955,000
Arcole Midwest Corporation, Evanston, Ill.	10	3,433,000
Herlihy Mid-Continent Co., Chicago	4	2,448,000
Merritt-Chapman & Scott Corp., New York, N.Y.	2	1,456,000
KANSAS		
J. A. Tobin Constr. Co., Kansas City, Kans.	6	$3,371,830
M. W. Watson, Topeka, Kans.	25	2,663,488
Freeto Const. Co., Pittsburg, Kans.	60	2,395,570
Harry Henery, Inc., Ottawa, Kans.	56	2,238,692
Russell Ralph Co., Inc., Topeka, Kans.	26	1,840,128
MICHIGAN		
Louis Garavaglia, Centerline, Mich. (Includes joint ventures)	44	$14,712,863
L. A. Davidson, Lansing, Mich.	26	11,082,341
Denton Constr. Co., Grosse Pointe Woods, Mich. (Includes joint ventures)	19	8,200,018
Sargent Constr. Co., Saginaw, Mich. (Includes joint ventures)	15	7,083,548
S. J. Groves & Sons, Minneapolis, Minn.	10	5,795,108
MISSOURI		
Koss Construction Company, Des Moines, Iowa	5	$7,593,000
J. A. Tobin Construction Co., Kansas City, Kans.	4	6,046,000
Union Construction Co., Kansas City, Kans.	6	4,711,000
Stupp Bros. Bridge & Iron Co.,	1	3,974,000
Porter-DeWitt Const. Co., Popular Bluff, Mo.	1	3,784,000
Howard Construction Company, Sedalia, Mo.	12	3,286,000
W. J. Menefee Const. Co., Sedalia, Mo.	3	3,193,000
Fred Weber, Contractor, Inc., St. Louis, Mo.	2	2,645,000
NEBRASKA		
Missouri Valley Construction Co., Grand Island, Nebr.	24	$4,342,306
Francis R. Orshek, Inc., Fermont, Nebr.	7	2,062,913
NEW HAMPSHIRE		
Manchester Sand & Gravel Co., Manchester, N.H.	11	$6,800,000
Frank Palazzi and Sons, Johnston, R.I.	4	4,644,000
R. G. Watkins and Sons, Inc., Amesbury, Mass.	6	4,600,000
NEW YORK		
Johnson, Drake & Piper, Inc., New York, N.Y.	3	$15,202,000
Geo. M. Brewster & Son, Inc., Bogota, N.J.	2	10,560,000
D. W. Winkelman Co., Inc., Syracuse, N.Y.	2	10,196,000
John Arborio, Inc., Poughkeepsie, N.Y.	7	10,054,000
Lane Construction Corp., Meriden, Conn.	3	9,633,000
Conduit & Foundation Corp., Philadelphia, Pa.	1	9,343,000
Mount Vernon Contracting Corp., Mt. Vernon, N.Y.	2	9,221,000
Harris Structural Steel Co., Inc., New York, N.Y.	1	8,572,000
Hendrickson Bros., Inc., Valley Stream, N.Y.	2	7,278,000
Felix Contracting Corp., Mt. Vernon, New York	1	7,066,000
S. J. Groves & Sons Co., Inc., Minneapolis, Minn.	3	6,655,000
Del Balso Construction Corp., Bronx, N.Y.	1	5,950,000
Mathew DeGroot, Jerico, Vt.	1	5,950,000
Tulli & DiNapoli, Inc., Flushing, N.Y.	1	5,063,000
OHIO		
V. N. Holderman & Sons, Columbus, Ohio	2	$7,837,228
Bates & Rogers, Chicago, Ill.	1	7,805,138
D. R. Smalley & Sons, Celina, Ohio	1	4,698,862
Union Building & Constr. Co., Passaic, N.J.	1	4,471,711
Harry Miller Excavating Co., Suffield, Ohio	1	4,209,100
Fischer Constr. Co., Cincinnati, Ohio	1	3,863,807
Herkner Contracting Co., Cleveland, Ohio	1	3,741,595
D. W. Winkelman Co., Syracuse, N.Y.	1	3,221,747
C. F. Replogle Co., Circleville, Ohio	1	3,148,976
Pierce Constr. Co., Toledo, Ohio	1	2,577,797
Ralph Myers Contracting Co., Salem, Ind.	1	2,480,956
PENNSYLVANIA		
Lipsett, Inc., & Booth & Flinn Co., Philadelphia	1	$7,524,924
The Conduit & Foundation Corp., Philadelphia, Pa.	1	6,856,110
Central Pennsylvania Quarry & Stripping Co.,	1	5,883,748
Francis A. Canuso & Son, Philadelphia, Pa.	1	5,870,355
John F. Casey Co., Pittsburgh, Pa.	1	5,590,811
Latrobe Road Construction, Inc.,	1	5,368,982
Allegheny Contracting Industries, Inc., Pittsburgh	7	3,255,000
New Enterprise Stone & Lime Co., New Enterprise, Pa.	11	2,800,000
W. L. Dunn Construction Co., Cochranton, Pa.	14	1,800,000
RHODE ISLAND		
M. A. Gammino Constr. Co., Inc., Providence	7	$12,261,268
Campanella Cardi Constr. Co., Inc.,	4	3,446,899

constructions who "also do" highway work. Although their commitments in this field are not heavy, they are keeping a watchful eye on the highway program, especially the big structures and above-$5-million jobs involved.

They threw their weight around in the toll road boom where projects were large enough to appear attractive. It is expected that they will be increasingly active bidders in the upcoming Interstate Program.

Perhaps most widely known of these is Morrison-Knudsen Co., of Boise, whose world-wide volume runs in the $200-million annual category. A limited number of domestic highway jobs are counted among the firm's current dossier of 365 projects. These are currently taken mainly in Idaho and adjacent states for specific reasons. One is to keep its railroad outfit intact and ready for the intermittent but profitable assignments in this field where the company got its start.

Morrison-Knudsen's management has frankly looked askance at the cut-throat bidding and profitless operation of highway contractors in many areas, and has been able to bid and make a profit acceptable to the M-K management only by throwing a wealth of equipment into such work out of the huge pool maintained at Boise for general work. M-K did handle a big chunk of the West Virginia Turnpike, and

has participated in other scattered road projects often in joint venture. But like any once-little company that has grown big in contracting, it has done so by being patient and waiting for profitable bidding opportunities.

Another very large firm is Guy F. Atkinson, Inc., of South San Francisco. This company currently has its finger in shipbuilding, guided missile base jobs, power plants and other very large projects, and will take on a $50-million bid at the drop of a carefully estimated hat. As told to the *Roads and Streets* editor by a top executive, it got into road work in California some time back, as the state's freeway program began to spawn sizeable jobs. Soon the firm found that, in order to properly handle road jobs, specialized outfits would have to be maintained, headed by really top-grade key men, with a policy of going after volume production. Today, the highway end of the company, while still secondary, makes Atkinson one of California's biggest roadbuilders (see table). It currently holds several freeway contracts, and has been the largest participator in building Los Angeles' complex $10-million-per-mile Harbor Freeway. The firm is prequalified in Oregon and Washington, but currently has no work there. As with M-K, the Atkinson firm too waits for the "right" opportunities—jobs on which it is fairly sure of making a sound profit.

It would be hard to estimate how much highway work these large general contractors could assume. The guess is that they will figure prominently in bidding when the program hits its peak and if roadbuilding is as profitable as other heavy construction.

A cross-section of the industry reveals also a large number of really sizeable contractors who seek highway jobs as their primary specialty. Firms like Koss Construction Co. in Iowa have specialized in roadbuilding—sometimes as earthmovers or pavers, sometimes handling the whole job. These contractors who have stuck rather close to highway work have built up a background of experience, a highly skilled staff of key men and a fleet of roadbuilding equipment. They have pioneered new methods and machines. Usually, such outfits are equipped to take on allied types of construction, such as airport paving, but their bread-and-butter is highway work.

William J. Brewster . . . President of Geo. M. Brewster and Son, Inc., Bogota, New Jersey, with son George.

Guy F. Atkinson . . . of Guy F. Atkinson Co., South San Francisco, with son George.

Father and Son – Familiar Combination

Arthur J. Hendrickson . . . Board Chairman of Hendrickson Bros., Inc., Valley Stream, L.I. Arthur and two brothers founded firm (1922), each have son in business today; Arthur's son Milton, now president.

Anthony Mirabelli . . . President of Grandview Construction Co., Mount Vernon, N.Y. Another well-known brother combination, which has played large role on New Jersey Turnpike.

Brothers – Another Company Pattern

Typical of these is the Nello L. Teer Company which, although it has ventured into many types of other construction, has distinguished itself on the highway contracting scene. The North Carolinian, dean of the veterans, estimates he has, in his 47 years as a contractor, completed close to 10,000 miles of streets and roads—probably more than any other firm. Last year, Teer held about $32 million worth of contracts (including Latin America), completed about $18 million of work.

This then, is the hard core of roadbuilders who, under the Interstate Program, will compete against each other or will team up in joint ventures. At the same time, they are geared to handle the diverse run of state, county and city projects, of all sizes and types.

Supplementing these outfits are

(Continued on page 87)

'57 CHEVIES TURNED THE TOUGH

They took the "teeth" out of North America's toughest truck run in an amazing display of stamina and dependability! The Chevrolet Alcan test called for great truck components . . . and here they are, the same modern features you'll get in *your* '57 Chevy!

Modern high-compression 6's—a time-proved Chevrolet truck Thriftmaster 6 made the tortuous Alcan Highway test look easy . . . registered a high 18.17 miles per gallon! And Chevrolet truck 6's are the *most powerful* in their class!

Short-stroke V8's standard or optional for all models—with the shortest stroke of any truck V8's these new Chevy engines stand first in their field for efficient load-pulling! Their round-the-clock performance in Alaska proved it!

ALCAN HIGHWAY INTO A TURNPIKE!

Safe, sure brakes now Alcan proved—in light- and medium-duty models, Hydrovac power brakes* supplied up to 85% of the braking effort! Powerful Air-Hydraulic brakes* gave peak stopping power in heavy-duty models!

Unit-design cab and body construction—Chevrolet truck cabs and bodies remained tight and solid on Alcan bumps, showed that they're built to *last!*

Rugged Synchro-Mesh manual transmissions—they displayed never-say-die durability . . . came through with smooth, flexible, trouble-free performance throughout the entire 1,520-mile run!

*Easy-going Hydra-Matic transmission**—it reduced driver's work immeasurably in light-duty models and it saved wear on drive-line parts, too!

*Revolutionary Powermatic transmission**—Drivers of heavy-duty models reported shift-free driving ease on Yukon grades, safer downhill hauling with the hydraulic retarder!

Sturdy frames and long-leaf springs—these brawny chassis components proved they can take it when the going is roughest . . . took the Alcan's worst with strength to spare!

These Alcan-proved Task-Force 57 features and others like them (such as extra-heavy rear axles, mighty Triple-Torque tandem options, new, improved tubeless tires and easy-rolling Ball-Gear steering) are ready to tame your tough truck runs too! Boost your hauling profits by seeing your Chevrolet dealer soon! . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

**Optional at extra cost.*

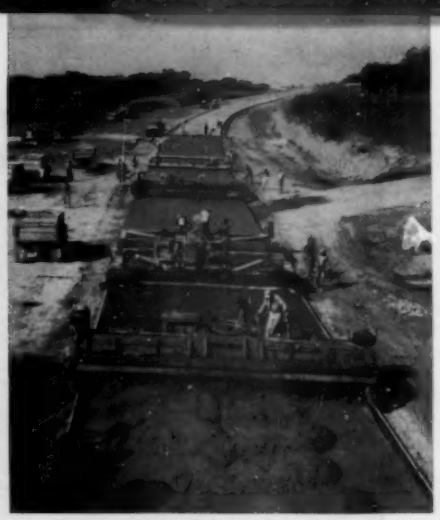
1957 CHEVROLET TASK·FORCE TRUCKS

PROVED ON THE ALCAN HIGHWAY... CHAMPS OF EVERY WEIGHT CLASS! CHEVROLET

. . . for more details circle 313, page 16

Earthmoving—Fewer contractors today do "only pan work," but more than ever handle excavation as basic job.

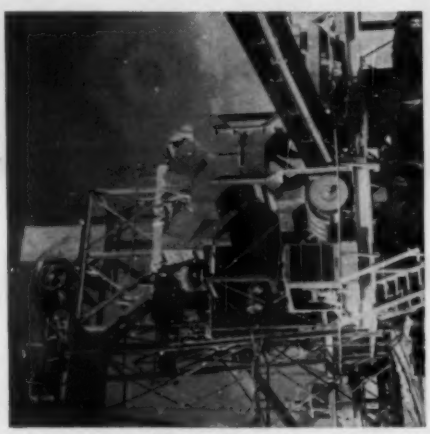
Bridges—Fastest growing category of highway work (grade separations) may take 1/3 of construction dollar under the Interstate program.



Concrete Paving—Some firms handling annual yardage in the millions. Highly routinized; specialization pays off in high efficiency.

Specialization—Some of the Common Types

Asphalt Paving—Hot-mix plants often fixed or semi-fixed in East, rubber-tired in the Middlewest and West.



Aggregate Production—How much produced on the job by the prime contractor? How much subbed to roving specialists? A $64 question.

Stabilization—A growing field for specialists. Some do soil-cement stabilization; practices vary between the various regions.

Clearing and Grubbing—Excellent field for effective specialization. Chain saws, tractors, have changed procedures.

Sealing — Treatment and sealing, most wide-spread single activity in highway field. Many firms do nothing but tanker and spray-bar work.

Culverts—A common way for new contractors to get started. Some firms glad to get this end of the work off their shoulders.

(Continued from page 83)

a vast number of local and specialty contractors to whom eventually trickles a large cut of the highway dollar.

Regardless of size or specialty, however, the common concern of the contractor is to obtain a sequence of jobs which will keep his key men occupied and his machinery in full production. In between assembling a grist of projects pushing them and cleaning them up—he spends considerable time estimating and bidding for new jobs to keep a flow of work in prospect.

The production operation itself is demanding. Every job calls for a different final product, spelled out in a custom-detailed set of plans and specifications. Every job is cast in a different setting of circumstances than the job before—different weather, different soil conditions, different labor requirements, different consulting engineers, different inspectors, different raw materials.

A LOGISTICS MATTER

Along his job, the contractor may progressively build and abandon a whole system of haul roads; he may encounter a variety of rock, each requiring different methods of blasting or excavation tools; he may cross swamp land which may have to be mucked out and backfilled; he may run into a half-dozen different kinds of soil, each requiring different compaction treatment to obtain the state inspector's approval; he may have to hunt for places to dump excess earth or to negotiate with farmers along the way for "borrow" material.

The paving contractor who follows, it is true, operates on a more refined site. Along a stretch of highway several miles long, however, his is a constantly changing problem of logistics of material flow focusing on the paver.

But the most carefully coordinated schedule is short-lived. For every foot the paver moves forward means a foot longer (or shorter) haul for the trucks hauling in sand, gravel or aggregate. And varying sources of local materials often make quality control a constantly changing problem.

Add to the kaleidoscope conditions of the shifting site, the unforeseeable changes in operations necessitated by wet weather or dry, and one can visualize the unpredictability of the roadbuilding operation. There is probably no other production process in America which forces the producer to obtain a uniform result from such a variety of circumstances.

The average contractor, according to the Bureau of Public Roads, juggles four jobs at a time, completing about two a year. Today's roadbuilder sets up and closes down "production lines" frequently hundreds of miles apart, at a pace that would make under-roof manufacturers cringe.

Mobility is another characteristic of the industry in 1957, a direct result of the toll road boom. The rash of turnpike construction offered a rapid series of "one-shot" opportunities in a score of states

Specialized Road Work Done by Contract

- Aggregate production
- Bituminous mix supply
- Bitum. tanker delivery
- Blasting
- Bridge installation
- Bridge railing
- Cement delivery
- Clearing and grubbing
- Concrete batching
- Concrete breaking
- Concrete curing
- Concrete joint sawing and sealing
- Concrete paving
- Concrete placement
- Crane service
- Culvert installation
- Curb and gutter
- Demolition
- Drainage
- Dredging
- Electrical work
- Fencing
- Foundations
- Grading
- Guard rail installation
- House moving
- Hydraulic filling
- Landscaping
- Lighting
- Material handling
- Painting
- Pile driving
- Precasting
- Ready-mixed concrete
- Riprapping
- Seeding and mulching
- Signalling
- Sodding
- Stabilization
- Structural steel fabrication, erection
- Subsurface boring
- Swamp excavation
- Toll collection & weighing equipment
- Traffic signal instal.
- Trailer hauling
- Trenching
- Underpinning
- White cement work

Maintenance and Repair

- Bridge painting
- Bridge repairs
- Joint renovation
- Guniting
- Line striping
- Mudjacking
- Patching
- Seal coating
- Surface heater work
- Surface treatment
- Undersealing

Specialization Picture in South Carolina

State highway prequalification list, October 1, 1956

No.	Specializing		Paving	Grading	Bit Surf.	Bridge	Hydraulic Emb.	Groin Work
5	Contractors do			X				
55	"	"		X	X			
26	"	"		X	X	X		
1	"	"		X	X	X		X
1	"	"		X	X	X	X	
1	"	"		X		X		
1	"	"		X		X		X
31	"	"				X		
3	"	"				X		X
1	"	"				X	X	
4	"	"					X	
1	"	"						X
4	"	"	X			X		
1	"	"	X	X				
11	"	"	X	X	X			
60	"	"	X	X	X	X		
2	"	"	X	X	X	X	X	
208	Totals		78	164	156	131	8	6

78 out of 208 do paving, 164 do grading, 156 bituminous surfacing, 131 bridge work, 8 hydraulic embankment, 6 groin work

and induced wide migration for the big jobs. Out of the period has developed a whole corps of medium and larger outfits who thrived on the million-yard contracts, developed extremely efficient production methods, and are still bidding aggressively for work far from home base.

INCREASING CONTRACT SIZE

To an extent, state highway departments, in planning completion of the 41,000-mile Interstate System will seek to capitalize on the skills and experience of the multistate contractors. Both the Bureau of Public Roads and the national contractor associations are encouraging the drafting of larger contracts to draw such firms into the bidding picture.

"It's far more economical and if we can get enough competition for larger contracts, it's a good way to save taxpayers' money," they reason. Rural sections of the superhighway network, particularly, can be let in long segments, making it possible for contractors to bid lower due to better job planning and equipment utilization.

C. D. Curtis, commissioner of Public Roads, recently enumerated the advantages he sees in such a practice:

"An early defining of the Interstate System will permit the letting of larger contracts in many instances. This will decrease repetition and duplication in advertising for bids, letting of contracts, and preparation of estimates. Fewer engineering parties and inspectors will be needed when several projects are consolidated into one. The larger projects also reduce contractors' moving-in and overhead costs, and permit better utilization of equipment and personnel which in turn should be reflected in lower bids.

"Recent studies disclose that contractors put in place $1.56 of construction work for every dollar of equipment utilized on a $300,000 job in contrast to $4.50 of construction put in place for each dollar of equipment on a $5 million job. The large projects are also more practical for the on-the-job production of materials such as sand and stone."

The letting of larger contracts may favor the already large contractors, federal officials believe, but the effect should be felt for a long way down the line.

"The normally $250,000-job contractor will seek, and probably obtain, the occasional $350,000 jobs he thinks he can manage," an industry spokesman explained. "Completing it successfully automatically puts him in line for more such jobs. In the roadbuilding market ahead, our contractors will be governed only by their own initiative, financial stability, and desire to grow. We expect that the industry's capacity will increase in every category."

Industry leaders point out that there has been a remarkable increase since the war in the number of firms capable of handling large contracts. "Ten years ago, there weren't a dozen outfits in New England that could tackle a million-dollar job. Today there are 50 to 55," Gordon Gaffney, executive secretary of the New England Road Builders' Association told *Roads and Streets*.

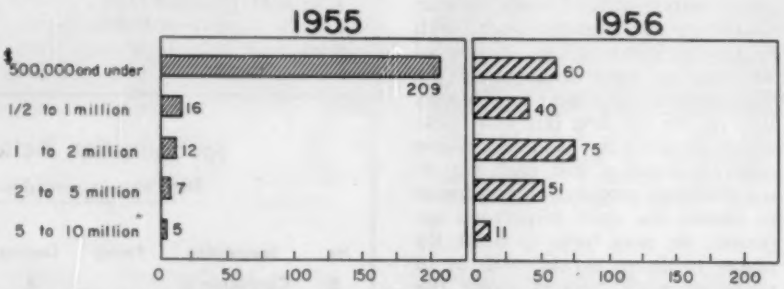
The suddenness with which the contractors in an area can expand their industry capacity is nowhere clearer than in a comparison of a state's prequalification list one year to another. The number on the list rose 25% last year in California, for example. In Texas, a dramatic burst of growth took place in 1956 over 1955, most of the under-$500,000 group jumping into higher brackets at the prospect of big things to come. The same number of contractors in Texas are handling twice the state road volume of four years ago.

MANY SMALL CONTRACTS

If larger contracts are adopted to capitalize on this capacity of contractors to expand, industry leaders foresee an increase in joint ventures and also in subcontracting to utilize specialists.

When Congress drafted the "Federal-Aid Highway Act of 1956," it insisted that provision be made for small contractors. In spite of the publicity being given to large assignments, it is generally known that the bulk of recent contracts has been of a size small firms can bid on. This is borne out in the

How Texas Contractors Revved Up Capacity



Spurred by job opportunities under the New Interstate Highway Program, Texas contractors prequalification list made a rush to step up their rated bidding capacity. Whereas two-thirds of them were $500,000 or under" in 1955, three-fourths of them emerged in the larger brackets in 1956.

Contract Sizes for 5,438 Federal-Aid Jobs (1955)

Size of Contracts	Number	Percentage of Total	Amount*	Percentage of Total
Up to $25,000	1,423	24.6%	$ 16.9	1.4%
$25,000 to $50,000	868	15.0%	32.0	2.6%
$50,000 to $100,000	990	17.1%	73.0	6.0%
$100,000 to $250,000	1,313	22.7%	210.0	17.4%
$250,000 to $500,000	661	11.4%	236.0	19.6%
$500,000 to $1,000,000	349	6.0%	248.0	20.6%
$1,000,000 or more	182	3.2%	391.0	32.4%

*In millions of dollars.

tabulation showing how many contracts of various sizes were let in 1955 for federal-aid projects.

Over 96% of the contracts let that year were for less than $1 million; 90.8% were for less than $500,000; and 56.7% were for less than $100,000.

This represents the broad center band of the market. It does not include the toll road projects which were mainly let in large amounts. On the other hand, it also excludes the county and city street projects which are more predominantly small contracts. It should be pointed out, too, that although the 3.2% of the contracts in the $1-million-and-over category account for 32.4% of the money, a big chunk of this effort was passed on to smaller firms through subcontracts. By joint ventures, a number of other small and medium-sized contractors also participated in the large contracts.

Job sizes are creeping upward (roughly paralleling the gradual price rise), the federal-aid contract averaged $206,000 in 1953 (5,040 jobs), $220,000 in 1955 (6,338 jobs), and $245,000 in just 9 months of 1956 (5,300 jobs).

Meanwhile, there continues to be a wide divergence in average contract size between the states. Last year Idaho's state road jobs averaged less than $80,000, Georgia's was $180,000, New York's and California's $650,000 and $900,000 respectively, heavily beamed to expressway work. To show one conspicuous example of growth in job size, Texas state road contracts averaged $316,000—up from $230,000 the year previous.

BIDS HOW COMPETITIVE?

The intensity of competition is revealed in bidding trends for 2,632 federal-aid projects on the primary and urban highway systems. These jobs averaged 6.1 bids, more in some states, Mississippi's 10.3 bids averaging highest.

Bidding averaged below estimates in every state except Wyoming and Kansas. In 16 states, the low bids were more than 10% below the engineer's estimates, in several instances much lower. (New Jersey, 19.5%; New York, 17.3%; North Dakota, 15.2%.) The national average was 7.4% below.

Secondary road jobs averaged 5.3 bids per job, and 8.5% below the estimates. Competition was particularly intense for secondary work in California and New York (12 bids per job), Florida (11), and Connecticut (10.5). Bids ran almost 23% under engineer's estimates in California, almost 22% under in New York.

What size contract is the most popular? An analysis of 581 federal-aid project lettings (exclusive of secondary system jobs) in the last quarter of 1955 reveals that:

- Contracts for $250,000 to $500,000 jobs drews the most bids—an average of 7.3 each, compared to 6.1 bids for all kinds of jobs. The low bids for these averaged 6.8% below estimates, compared to 5.3% below for all work.

- Competition for $500,000 to $1-million jobs was almost as strong—average of 7 bids each.

In spite of the greater average number of bids in these categories, bids for some small contracts ran significantly farther below engineer's estimates. Contractors seeking work in the under $25,000 category bid 7.1% below engineer's estimates; in the $25,000 to $50,000 category, 9.1%; in the $50,000 to $100,000 category, 8.4%.

In nearly every state a few aggressive bidders garnered more than their average share of 1956 jobs. Examples:

- In Wyoming, seven firms took from 2 to 7 jobs each while 40 of the 130 accredited companies did not bid at all.

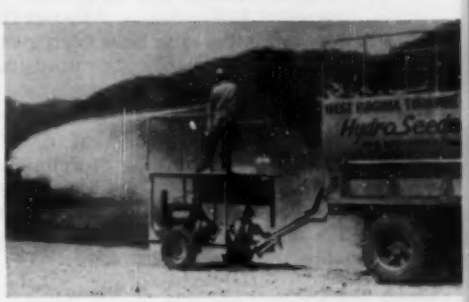
- South Dakota, of 181 prequalified contractors, six got one-third of the available jobs.

- North Carolina's 401 projects last year, while relatively well distributed among 103 firms, were still somewhat concentrated, with 37% of the companies having no work in progress, and one firm (Dickerson) holding 26 contracts.

Lying behind all this welter of figures is the fact that officials can continue to expect competitive estimates from an expanding "pool" of contracting firms both large and small. These include many out-of-state firms. The influx of such contractors qualified on the active lists of the state highway departments ranges from such lows as two in Rhode Island and eight in Michigan to highs of 110 in Washington,

Joint Sawing—One contractor now subs this work in many states.

MORE SPECIALISTS



Landscaping—Lends itself well to specialists, often local firms with special experience.

Hauling—Material hauling for special fill, base and paving stone, a major job element.

Pre-casting—Combined with prestressing, destined to grow fast spurred by steel shortage.

Lighting—Handled by electrical firms, another growing field for urbanized jobs, ramp areas, etc.

153 in Oregon and 184 in Maryland.

An analysis of the list of contractors qualified to work in Kansas, for example, reveals that only 219 of the total 382 firms are Kansas-based. They represent a capacity of $249 million out of a total capacity of $340 million. Most of the 12 contractors who have been given an unlimited rating are out-of-staters.

Perhaps the most self-contained group of contractors is that in California where the only "foreigners" are big multi-state firms which have well-organized California units amounting virtually to separate companies.

MORE SPECIALIZATION

The increasing volume and complexity of highway construction has been stimulating considerable specialization in recent years, leading in turn to a growing pattern of subcontracting.

Excavation, structures, and paving are natural divisions of the roadbuilding operation. Highway departments draw up "package" contracts to include all the work involved on a specific job or section of a large project. Or they may let separate contracts for each of these specialties. The advantage of the former practice is that of having only one contractor to hold responsible (and enabling him to control and synchronize all dovetailing job elements); the advantage of the latter is that it frequently draws more bidders.

Even though letting a job as a whole, most states permit the prime contractor to pick the paving end and subcontract the grading and structures, or vice versa. Although there is a limitation of 50% subcontracting on federal-aid projects, this has meant sufficient latitude to permit the steady growth of specialization.

In Iowa, an analysis of 156 highway contractors who are members of the AGC reveals that 102 specialize in some one type of work—grading (35), paving and surfacing (32), or bridges (35); or almost equally divided.

Earthmoving specialists while few in the number who literally do nothing else, are really the most widespread and basic of all the specialists. The number of firms equipped to do this work was never greater according to a Caterpillar spokesman. It depends on the definition of specialist.

Specialization often is best revealed in subcontracting. On the Massachusetts Turnpike, fifteen of the prime contractors who took grade-drain-structure jobs ranging from $1.2 to $6.3 million each, negotiated 50 subcontracts. Some of the subcontractors were specialists, a few also held prime turnpike contracts. The subcontracts included 10 for bridge work and steel erection, 7 pile driving, 9 clearing and grubbing, 3 pipe culverts, 3 rock excavation, 2 chain link fence, 6 seed, mulch and sod, 2 drainage, 2 aluminum handrailing, 2 painting steel, 1 peat excavation, 1 electrical ducts, 1 bituminous concrete, 1 placing reinforcing steel.

The 89 prime contractors on the Ohio Turnpike rang in at least 450 subcontractors and there was even some sub-subcontracting.

A study of 691 contractors polled by the American Road Builders' Association in three regions—New England, the Far West, and a group of Midwestern states—gives a further picture.

Out of the 691 firms reporting, 298 (or 43%) let some work to subcontractors last year. There were regional differences—50% of the New England contractors let subcontracts 35% of the Midwestern, 42% of the Far Western. Together, they "farmed out" 13% of their prime contract volume. Dollar-wise, 30% of the subcontracts were for earthmoving, 29% for surfacing, 25% for structures and 16% for all the other specialties.

The greatest proportion of subcontracting was among larger contractors. More than 74% of the contractors in the $5-million-and-more bracket let work to subcontractors, enough in fact, to account for 53.7% of the total sublet.

Contractors reporting a year's production in the $1-million to $5-million bracket accounted for another 34.5% of the subletting. Nearly 60% of them indicated they sublet work. Thus 88% of the work load passed on to subcontractors came from prime contractors in the $1-million-a-year-and-up categories.

BUST IN A BOOM

The spiraling highway contractors' market has brought with it that paradox that frequently accompanies business booms—an increasing rate of failures. Businessmen who have learned to identify the threats to their well-being in a normal market, sometimes fail to recognize the different conditions in a quickly expanding market that can add them to the casualty list.

Kenneth Henry of Dun & Bradstreet recently pointed out that 40 roadbuilders fell by the wayside in the record construction year of 1955, and firms were failing at the same rate through the early months of 1956. This compares with an average of less than 15 failures a year for the last decade.

He was quick to explain that the soaring failure rate is one of the growing pains of the industry—a sign of *good* times, not bad. But failures are failures regardless of cause, and experts are warning on

Connecticut: Biggest 1956 Toll Road Push

(Some of the largest contract holders in the Connecticut Turnpike's $200-million-plus program.)

	No. Awards	Bid Total
Merritt-Chapman & Scott Corp., Inc., East Hartford, Conn. (Savin Construction Corp., subsidiary)	5	$29,189,000
L. G. DeFelice & Son, Inc., North Haven, Conn.	4	26,956,000
M. A. Gammino Construction Co., Providence, R. I. (Including 3 jobs in joint venture with Brunalli Construction Co., Southington, Conn.)	4	25,835,000
Poirier & McLane Corp., New York, N. Y.; Poirier & McLane Corp., and D'Addario Construction Co., Bridgeport, Conn.	2	16,500,000
American Bridge Division, U. S. Steel Corp., Pittsburgh, Pa.	2	12,250,000
Gull Contracting Co., Inc., Flushing, N. Y.	1	10,186,000
Lane Construction Corp., Meriden, Conn.	1	10,050,000
Lizza & Sons, Inc., Oyster Bay, N. Y.	2	8,500,000
A. J. Orlando Contracting Co., Edenwald Contracting Co., Whitestone, N. Y.	1	7,437,000
Slattery Contracting Co., Maspeth, N. Y.	1	7,336,000
Cayuga Foundation Corp., New York, N. Y.	1	7,282,000
Union Building & Construction Corp., Passaic, N. J.	1	6,513,000
Terry Contracting Co., Inc., New York, N. Y.	1	6,390,000

every hand that it is possible to go bust in a boom just about as easily as in poor times. Contractors, they say, must recognize the inherent threats in a quickly expanding market.

Back of the 40 roadbuilders who bowed out last year was a variety of reasons for bankruptcy, but the pattern of failure in the midst of plenty is emerging. Arch Gay, executive secretary of the Virginia Road Builders' Association, has summed them up: by saying that failure is usually due to more than one of the factors of overexpansion, inexperience, cut-throat bidding, too little capital, and poor cost records.

These are the major reasons why some contractors are not riding the crest of the biggest roadbuilding market of the nation's history. Competition is being singled out for much of the blame, but the fact is that in quickly expanding, the contractor can usually look to his own shortcomings for the causes of financial trouble.

CLIMATE FOR PRODUCTIVITY

The flexibility of the contracting industry, its ability to expand, to take on all sizes of jobs, its ingenuity in developing new methods, its adeptness with powerful, fast equipment, its construction know-how and technical skill, all are characteristics which assure its ability to meet the demands of the expanded road program. Thanks to a thorough presentation of these facts by the American Road Builders' Association last spring, Congress dismissed any concern that the then-proposed $100 billion (15-year) program would overburden the industry.

Nevertheless, if the multi-billion highway program, as now adopted, is to be translated into actual new roads at anywhere near the pace Congress expects, materials must flow to job sites, and equipment manufacturing must keep pace with what will be an unprecedented demand for production machines. Financing, planning and engineering procedures in the state highway departments must all be streamlined to create a steady flow of jobs.

Only if all these factors work to their advantage can contractors keep their men and machinery operating at the full capacity essential to complete highways quickly for the lowest possible prices.

The burden of setting the pace rests, of course, with the state highway departments. Increasing the size of contracts so that a contractor can utilize mass production methods is one way state engineers can speed up production. There are numerous others. If highway officials will remove all possible roadblocks to contractor efficiency, they can create a climate in which productivity can hit a stride heretofore deemed impossible.

A survey of 919 highway contractors by ARBA (heretofore unpublished) reveals some of the possible bottlenecks roadbuilders are worried about:

- Delays by highway departments were cited more frequently than any other possible roadblock to full production.
- More than half of the contractors indicated concern that their state engineers will not be able to produce plans in the volume necessary to permit full production.
- 44% believe that a shortage of supervisors will retard their expansion.
- 43% blame materials shortages for limiting their capacity.
- 39% claim that slowness in paying estimates will hamper their effort. (And in answering another question, 92% of the 919 contractors said highway departments should be required to pay interest on estimates due contractors not paid within 60 days after final acceptance of the project.)
- Several reported that final estimates are sometimes six to nine months late. One protested, "If the final payment situation isn't improved in this particular state and an additional work load is thrown on them, the contractors might be waiting two years for their final payments. If that happens, we will just close our books and seek work elsewhere."

More Examples of Big Contract Backlogs

(Firms having largest dollar volume of active state highway contracts in various stages, as of August 31, 1956)

STATE	NO. AWARDS	BID TOTAL
CALIFORNIA		
Guy F. Atkinson Co., San Francisco, Calif.	8	$18,740,609.46
Peter Kiewit Sons' Co., Arcadia, Calif.	6	14,425,296.22
Gordon H. Ball, Danville; Gordon H. Ball & Ball and Simpson, Berkeley; Gordon H. Ball & Erickson, Phillips & Wiesbert, Concord, Calif.	6	13,854,490.90
Frederickson & Watson Const. Co., Oakland; Frederickson & M-K Corp.; Frederickson & Watson Constr. Co. & Ransome Co., Emeryville, Calif.	8	13,796,626.67
J. E. Haddock, Ltd., Pasadena, & R. M. Price Co., Altadena; J. E. Haddock, Ltd.	3	12,649,008.18
Griffith Co., Los Angeles, Calif.	8	12,386,884.55
Vinnel Co., Inc., & Vinnell Constructors; Vinnel Co., Inc., Alhambra, Calif.	3	10,418,552.27
United States Steel Corp., Pittsburgh, Pa.	1	9,972,565.05
McCammon-Wunderlich Co., & Wunderlich Contr. Co., McCammon-C. K. Moseman	2	9,844,159.70
Madonna Construction Co., San Luis Obispo, Calif.	6	8,792,137.88
Grove, Shepherd, Wilson & Kruge, Inc., of New York City and Calif.	2	8,527,185.09
Ferry Bros., Glendale, Calif., John M. Ferry, Peter L. Ferry & Son, & L. A. and R. S. Crow, El Monte, Calif.	1	7,828,763.46
Stolte, Inc., Oakland & Gallagher & Burk, Inc., Oakland	7	7,389,317.17
MacDonald, Young & Nelson, Inc., San Francisco, and Morrison-Knudsen Co., Inc., Los Angeles	1	5,656,268.10
A. Teichert & Son, Inc., San Francisco, Calif.	4	5,294,010.01
NEW JERSEY		
Geo. M. Brewster & Son, Inc., Bogota, N.J.	2	$10,200,000.00
Public Constructors	4	8,000,000.00
Reid Contracting Co.,	4	4,500,000.00
TEXAS		
Ernest Lloyd, Fort Worth, Texas	27	$ 9,156,358.43
Cage Brothers, San Antonio, Tex.; Cage Brothers & T. C. Page, San Antonio, Tex.	21	7,286,098.80
Killian-House Co., San Antonio, Tex.	7	6,436,106.74
Austin Bridge Co., Dallas, Tex.	12	5,812,623.05
Austin Bridge & Worth Constr. Co., Dallas	4	4,567,556.10
Austin Bridge & Austin Road Co., Dallas	4	3,253,985.42
Austin Road Co., Dallas, Tex.	7	2,645,881.54
Texas Bitulithic Co., Dallas, Tex. (Warren Subsidiary)	8	3,838,491.96
Gulf Bitulithic Co., Houston, Tex. (Warren Subsidiary)	8	2,635,795.95
R. B. Butler & J. H. Howard, Bryan, Tex.	9	2,548,770.30
Ivan Dement, Amarillo, Texas	10	2,226,989.80

In a meeting sponsored by AGC, over 100 contractors met recently with highway officials to explore measures which might speed up constructions. Here are a few of the recommendations:

Invite lump-sum bidding on bridge structures (by project): This practice is popular already in many states. The BPR approves the practice on federal-aid jobs, asking only: (1) that plans and specifications be complete, (2) that quantities for major items be computed with sufficient accuracy at the preliminary engineering stage to determine the most economical design, (3) that an adequate engineer's cost estimate be prepared for evaluation of bids received, and (4) that fair unit prices be stipulated in the special provisions as a basis for adjustment of items on which over-runs or under-runs are likely to occur.

Standardize more structure plans: Such a step would save engineering man-hours as well as materials, contractors believe. They point out that attention could be given to uniformity of virtually all bridge elements. Standardized structures, they say, would permit contractors to re-use concrete forms and realize major savings.

Establish more uniform compaction specifications: Roadbuilders now work under a wide variety of requirements, some of them unnecessarily specific. They want specifications that spell out results desired, rather than equipment or methods to be used, and which will let them use the same equipment on both sides of the state line.

Advertise projects further in advance of letting: The contractors want at least three weeks to investigate and estimate before bidding on a big job, preferably a month.

Relax regulations hampering movement of contractor's equipment: As the number of highway projects increase, contractors will be transporting equipment from jobs much more frequently. Some states need to streamline their permit procedures and to repeal legislation which unnecessarily restricts speedy movement of equipment over the highways.

Step up removal of utilities in path of new highways: "All too frequently contractors' operations have been complicated and their costs boosted by failure of utilities to remove their lines in advance of construction," the contractors agreed. "If we are going to complete jobs on time, we must have cooperation on such matters." Utility relocation frequently can be completed well in advance of construction, if the state procures the right-of-way early, and makes proper arrangements for the chore.

Schedule lettings on a more regular basis: Again, as on other occasions, the contractors appealed for lettings earlier in the year to stretch out their construction season.

"If they would let jobs in February," one roadbuilder pointed out, "we could move our equipment in before the spring road restrictions are posted. And we could finish jobs that would otherwise drag over into another season."

The recent seasonal pattern of lettings (BPR figures) is that 19% of the 1955 federal-aid projects were let in the 1st quarter, 35% in the 2nd quarter, 27% in the 3rd quarter and 19% in the 4th.

HIRING MORE ENGINEERS

As highway work has become more complicated and exacting, the contractor has needed more technical savvy. The answer: more engineers in the firm or on the payroll. More often than not, the son who plans to join his father's contracting business is obtaining a civil engineering education.

A New England contractor said recently: "Ten years ago, we owned one transit. Today we've got a dozen—and they're all in use."

One of the nation's top paving contractors noted that in placing 800,000 square yards of concrete pavement he worked under 12 different consultants, each with individual ideas of how the work should go. "We had to have an extra engineer just to protect our interests," he said.

Many states are requiring more engineering work to be accomplished by the contractor, particularly since the shortage of skilled men has depleted their own ranks. In Massachusetts, Ohio and other states, contractors are being asked to take on the work of staking out the job. In other states, "simplified" procedures such as bidding on a per-mile basis have merely shifted the engineering load to the contractor.

Such assignments add to the engineering complexion of the contracting business. The AGC estimates that its 6,800 members employ 30,000 civil engineers. The needs of all kinds of contractors for engineers will jump 40% within the next 3 years, AGC predicted.

Although fiercely competitive in their business activities, highway contractors have combined forces at both the state and national levels to effectively promote general industry objectives. Through such organizations, they have been able to help develop the construction market, popularize the contract method, write standard contract forms, defeat unreasonable legislation, influence realistic specifications and design, and work out good relationships with state and county highway officials. Through the media of annual conventions, technical committee activities, and periodicals, they regularly exchange techniques and ideas that have advanced the practice of roadbuilding.

Contractors form one of the most powerful divisions of the American Road Builders' Association, which maintains headquarters in Washington, D. C., and is supported by 14 affiliated state and regional contractors' groups. Under the big tent of ARBA, highway contractors

The Contractor as a Materials Supplier

Contractors not only build the roads; they frequently furnish the materials. The Bureau of Public Roads has found that 58% of the aggregate used in highway work is "contractor produced." A big percentage of the "commercially produced" is probably out of plants partially owned by, or subsidiary companies of, the contractor.

Of the contractor-produced aggregate, from 75% to 90% is produced by portable machines, the BPR believes. Setting up such a plant just off the project, the contractor frequently can utilize local materials and avoid long hauls from distant quarries.

EFFICIENT USE OF EQUIPMENT IS CONTRACTOR'S CHIEF CONCERN

Today's highly mechanized road contractor literally builds his business operation around equipment ownership and management. In 1957, he will trade in or expand to the tune of 94,000 equipment units costing probably $900 million, according to an ARBA estimate.

The aspects of his equipment problem are many. Here are a few:

1. Equipment investment is putting him in an ever tighter squeeze, due to rising machinery prices and the intense competition. H. W. Morrison of Morrison-Knudsen Co., Inc., recently declared, "In recent years the economic paths of equipment makers and sound construction practice have been noticeably divergent—equipment prices following a steep upward tangent, with construction prices on a moderately ascending curve. The pinch comes particularly on jobs of long duration, when replacement machinery must be bought at elevated prices greatly exceeding the cost estimate of the job, and without contract provisions for escalation to cover such contingencies."

M-K's answer, according to Morrison, is to carefully appraise all factors in estimate future contracts, and to tailor and time purchases more closely to job needs.

CREDIT GETTING TIGHT

2. Equipment financing is a problem of growing concern. We don't mean the shoe-string financing of new contractors, which some equipment house is always willing to offer. The new problem is that of scarcity of credit money and rising interest rates. The ARBA has just announced a new Task Force Committee to inventory credit needs of all branches of the highway industry and determine how these needs can best be met.

Balanced against credit financing is the problem of carrying equipment for long periods until contract payments come through. Industry committee action is aimed at cutting red tape and releasing payments more promptly in some states. Also in cutting down the amount collectively tied up in cashiers checks tendered with the many bids entered in an effort to land work.

3. Choosing the right equipment units for a given job or work program is more essential today than before. A machine "almost right" may still be too costly for given conditions and out of balance with over-all production requirements. Advance job analysis to determine performance and cost factors is becoming a more exact art, and frequent re-analysis as the work progresses is often imperative.

ANYTHING TO KEEP BUSY

4. Getting the maximum number of working days per year out of each machine is another key to profits. Much of the maneuvering of the individual contractor—subletting to the fellow who under-bid him, farming out machines and operators, trading some units off, bidding this job or that—it's all with an eye for achieving season-long capacity operation.

Many project fleets today are not static, but machines are being moved in or out, so as to keep the project manager charged only with units he actually needs in any given week—again to achieve maximum equipment utilization.

5. Equipment maintenance and repair have become a major management element. Whether to have a central shop with its high overhead, or do all overhauling in the field, or let the distributor handle heavy repairs is a matter of which is cheapest and most expedient. Preventive maintenance—once notoriously neglected—today is the mark of a well managed road contracting firm.

6. Training operators and mechanics is a systematic part of the management task, with manufacturers and distributors offering cooperation. The contractor must find, train and keep top-grade operators who can get the most out of his coordinated, high-speed equipment operation.

tackle inter-industry problems with equipment manufacturers, materials producers and other industry components.

The roadbuilders work out problems held in common with building and heavy construction contractors through another national organization, the Associated General Contractors of America. The AGC, supported by a number of state and regional chapters, has developed joint cooperative committees with state highway officials, airport officials and other letting agencies. Its highway contractor membership has grown from 1,072 in 1939 to 1,825 in 1946 and 2,912 today.

Both associations are currently engrossed in helping to ease the engineer shortage and in helping the U. S. Department of Labor to obtain true labor wage rates required on Interstate System projects.

Question: What's Ahead?

From where he stands in January of 1957, what does the highway contractor see in the months and years ahead? Just how sound is the construction market envisioned in the National Highway Program? Will the big undertaking actually provide an orderly stream of projects? Will a fairly constant climate of costs make estimating easy? Or will run-away material and equipment costs turn it into a rat race, forcing estimates up from the bottom while cut-throat competition forces bids down? Will contractors find themselves handling a lot of work and making little money? Some of the more informed "guesstimates":

- The roadbuilding market is sure to be steady. Until someone comes up with a device which eliminates the automobile and the truck, there will be roads to build. Auto production is forcing a demand for roads that will take years to satisfy, if ever.
- That market has been significantly stabilized by the increased and now long-range participation of the federal government. It seems unlikely that Uncle Sam's role will diminish.
- Material prices will probably continue to rise—steadily over the long run, in jolts and spurts by regions and under tight market conditions. The demands of other types of construction will have much to say.

(Continued on page 96)

Up it comes as the operator slides the cutting-edge under the concrete and applies break-out action. Photo shows how the slab usually breaks before it topples over.

Authorities forbid breaker ball, so contractor removes 8″ concrete with 2¼-yd. Michigan

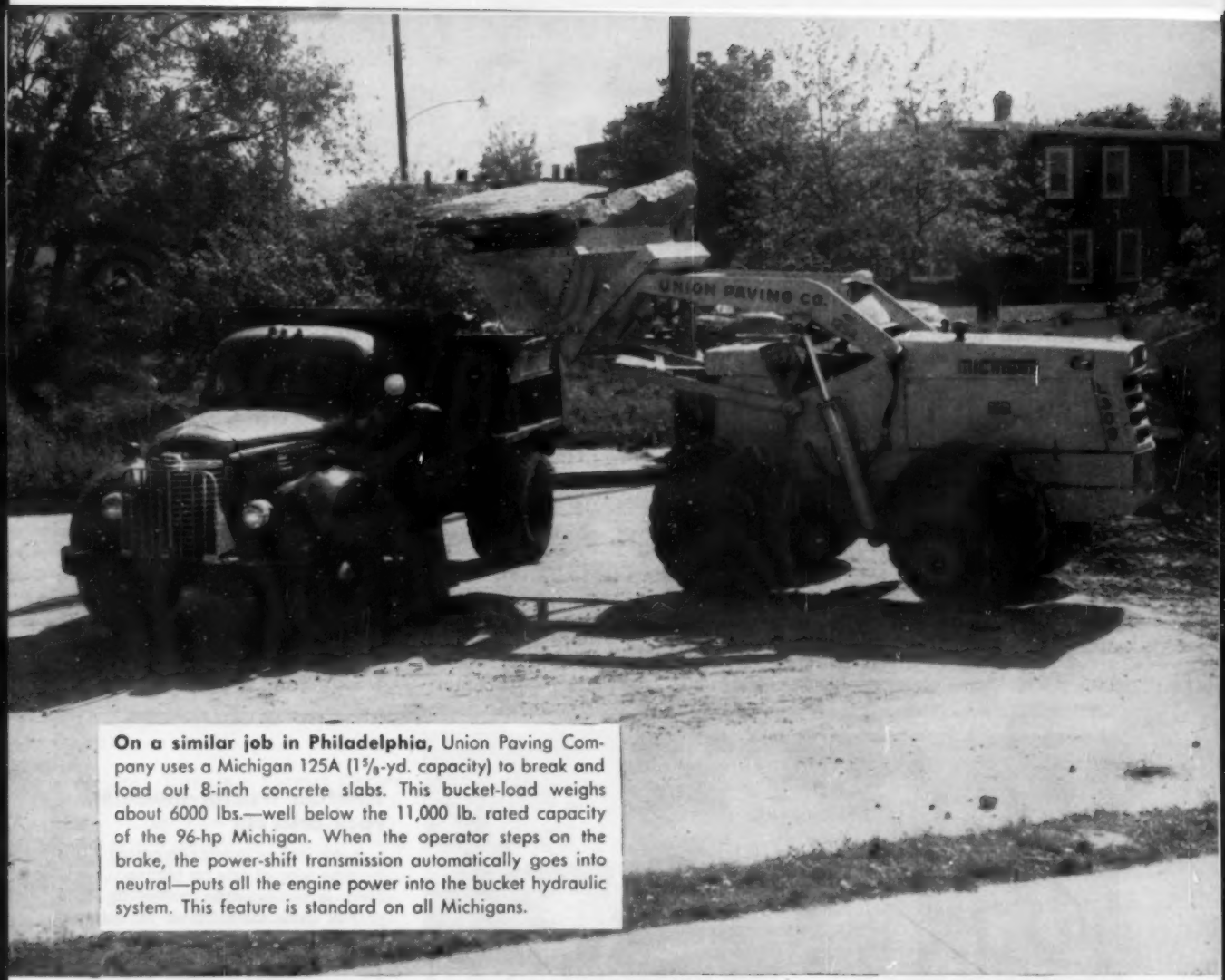
Contractor Roberts E. Latimer, Jr., Inc., Silver Spring, Maryland, ran into trouble on a recent job. The contract called for removing a stretch of highway where the concrete slabs were 8-inches thick by 12-ft. wide. When they bid the job they expected to break up the slabs with a breaker-ball. But when they went to work, authorities told them that a decayed 14-inch gas main ran underneath the road. "No breaker-ball—too dangerous."

Crane wouldn't work

Latimer tried to break out the slabs with a ¾-yd. crawler shovel; it wouldn't work. Next they tried a crawler-loader; it didn't have enough lifting capacity or break-out power either. At this point Paving Supply and Equipment Co., Washington, D. C., suggested that they try a 2¼-yd. Michigan Model 175A on the job. Latimer frankly didn't believe that *any* type of loader could break out the heavy slabs —much less a rubber-tired machine. But they finally agreed to let the distributor demonstrate the Michigan. When they saw, they bought.

Michigan's exclusive break-out action

The photograph on this page shows how the 133-hp Michigan handles the job. The operator slips the bucket cutting-edge under the slab. Then he applies bucket break-out action. When the slab has lifted about 2 feet, he eases forward, gets under the slab as he lifts the bucket. The concrete usually breaks as it's being raised. If it doesn't break, the Michigan pushes it over the curb to a spot where the breaker-



On a similar job in Philadelphia, Union Paving Company uses a Michigan 125A (1⅝-yd. capacity) to break and load out 8-inch concrete slabs. This bucket-load weighs about 6000 lbs.—well below the 11,000 lb. rated capacity of the 96-hp Michigan. When the operator steps on the brake, the power-shift transmission automatically goes into neutral—puts all the engine power into the bucket hydraulic system. This feature is standard on all Michigans.

ball can be used safely. Then the Michigan loads out the chunks.

Moral: see it in action

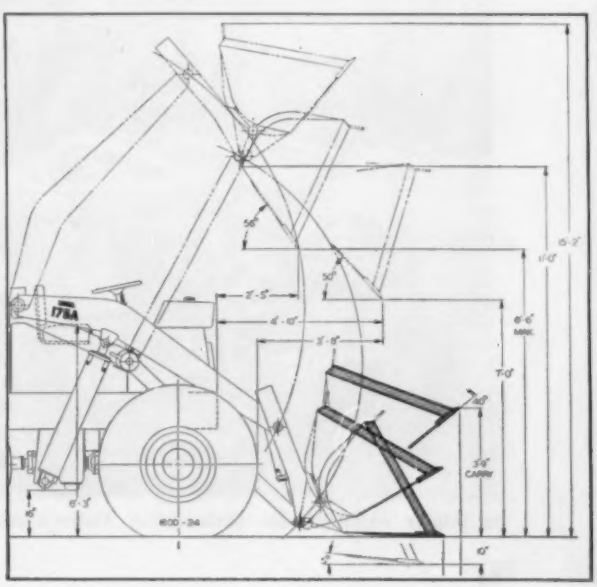
Like Roberts E. Latimer, Jr., Inc., more and more contractors are using Michigan Tractor Shovels as construction prime-movers. It's no accident that this machine will handle jobs that have never even been attempted on rubber. The complete Michigan power-train—torque converter, power-shift transmission, planetary axles—was designed and built by Clark to give this machine more useable power and traction than you've ever seen on any rubber-tired tractor shovel. Before you decide that this type of machine can't handle a particular job, do what Latimer did. Ask for a Michigan demonstration. *You name the job.*

CLARK® EQUIPMENT

Michigan is a registered trade mark of
CLARK EQUIPMENT COMPANY
Construction Machinery Division
2497 Pipestone Road
Benton Harbor 13, Michigan

. . . for more details circle 219, page 16

Below: **Low-level breakout force** of the Michigan 175A is applied by two 7-inch double-acting bucket cylinders; the full tip-back is 40 degrees. Note the clean design of the Michigan bucket mechanism—preserves the dumping clearance over truck sideboards.



THE HIGHWAY CONTRACTOR

(Continued from page 93)

● Equipment prices, up 8% over last year, will continue to rise with inflation generally, but sharp competition in this industry is expected to keep costs in line. Manufacturers are expanding plant capacity.

● Contractors probably will not be operating at full highway-building capacity for at least the first two years of the new program. State highway departments need time to get going. The last few months, however, has seen closer cooperation between state officials and contractors.

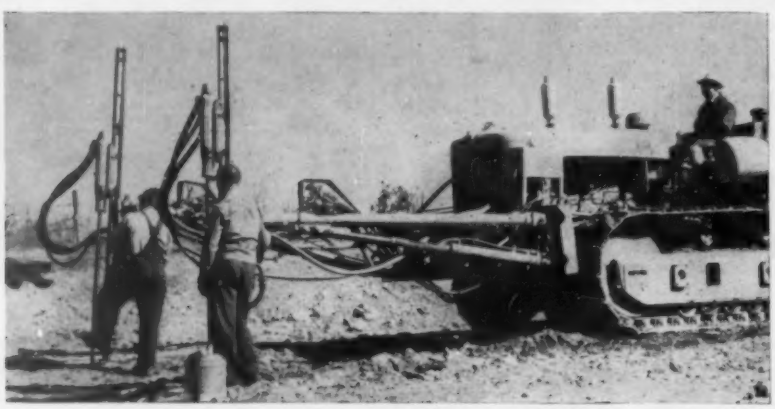
● Contracts will be larger on arterial construction, following contractors' growing ability to handle larger jobs. State highway departments say they will let jobs at levels where they obtain the greatest number of bids. But the greater number of contracts will continue to be for smaller or specialty jobs.

● Competition between contractors will continue acutely sharp, especially for the first big interstate jobs. The battle will be between the established Titans and those who are willing to take the gambles of fast expansion necessary to get and build this type of job.

IN CONCLUSION

Contractors individually and through their groups are appreciative of the highway departments' big task and lack of personnel. They are taking an active part in getting better engineering salaries. And in more and more states they have proved willing to accept construction plans and estimates turned out by aerial photography, electronic computers and other engineering short cuts. They have accustomed themselves to working with a number of consulting engineers rather than with one agency.

Beyond such cooperation, however, contractors exert little influence on the speed and efficiency with which their state highway improvement programs reach the contract stage. Much of the success of the National Highway Program to turn highway dollars into modern roads and safe streets will hinge on how completely highway administrators capitalize on the productivity of the American contracting industry. They have at their disposal a pool of experienced enterprisers, well-equipped, eager for work . . . and ready to go.



Another tractor-mounted rock drill rig

A variety of tractor-mounted drills is to be seen of late on highway work. Here is an example, consisting of a pair of drills mounted on an International TD-24 tractor. Contractor is Gillioz Construction Co. Job, an 11-mile contract near Rolla, Missouri.

● **Pair of drills mounted on an International TD-24 tractor.**

● **Dredge which did the business for Alabama contractor.**

Contractors build dredge fed sand plant

This sand and gravel pumping operation in the Brewton, Ala., area produced 150 cu. yd. of specification gravel and 300 cu. yd. of sand each 8-hour shift. Owner: Johnson Brothers Sand & Gravel, of Brewton. The pump, powered by an Internation UD-18A engine, lifted the raw material about 14 ft. to pump level, pushes it on-level for a distance of 300 ft., then boosted it 40 ft. more to the screening operation.

● According to the U. S. Chamber of Commerce, during the next 13 years, more money will be spent for highway construction on the federal-aid system alone than has been spent during the last 26 years on all federal, state, local and city streets.

Directory of Show Exhibitors

The companies which will have displays at the Chicago Show, January 28 through February 2, together with their booth locations at the Amphitheater, representatives in attendance, and company hotel headquarters. Data as complete as possible up to press time.

Booth location references: .(SHD) South Hall Downstairs, (SHU) South Hall Upstairs, (NHD) North Hall Downstairs, (NHU) North Hall Upstairs, (EH) Exposition Hall, Annex, (Don.) Donovan Hall, (A) Arena.

Acme Iron Works. Booth 610 (SHD). New 12-ton Ingram roller with "Reverse-O-Matic" drive. In attendance: H. B. Ingram, Bryant Ingram, E. M. Anderson. Hotel headquarters: Conrad Hilton.

Aeroil Products Company. Booth 228 (SHU).

Aeroquip Corporation. Booth 206 (SHU).

Alemite Division, Stewart-Warner Corporation. Booth 353 (NHU). Everything from the smallest lubrication fittings and hand guns to the custom-made portable service stations. Alemite's line of Versatal materials handling equipment and pumps (air-operated) used in handling caulking materials as well as paint will be exhibited. In attendance: T. M. Murphy, industrial sales manager; Pat Blahut; Ray Frazier, Sr.; Larry Kelley; Don Misic; George Cooke. Headquarters: Corporation's General offices, 1826 Diversey Pkwy., Chicago 14.

Allis-Chalmers Manufacturing Co. Booths 601, 603, 621 (SHD). Line of advanced design crawler tractors, motor scrapers and motor graders. Units on display by the Tractor Group's Construction Machinery Division will be headed by the 204 net engine hp HD-21 diesel torque converter tractors. One will be equipped with cable dozer and another with a 4 yd. tractor shovel. Other tractor models in the Allis-Chalmers exhibit will be equipped with dozers, shovels, and side boom.

The company's motor scrapers rated up to 20 yd. heaped capacity, a 15 yd. rear dump wagon and a pull-type scraper are the big rubber-tired earth-moving units to be shown. The Model D motor grader, 50 hp, gasoline or diesel powered, will simulate shoulder construction and maintenance. A 6000 lb. capacity fork lift truck for material handling jobs, diesel power units, and a diesel generator set are included among the Buda Division products. Models of the new A C L cement processing plant and a gyratory crusher will be shown by Industry Group of Allis-Chalmers. Hotel headquarters: Morrison.

Allison Division, General Motors Corporation. Booth 327 (NHU).

American Bosch Div. Booth 230 (SHU).

American Chain & Cable Co., Inc. Wire Rope Divisions. Booth 357 (NHU). New "V H S" (Very High Strength) wire rope developed especially for drag lines, shovel hoist ropes, dozer and scraper cables. ACCO "Registered" Cable-laid wire rope slings and the Dualoc boom cable assemblies. In attendance: E. H. Todd, divisional sales manager; G. A. Faerber; R. D. McNutt; P. D. Steele, district sales manager. Hotel headquarters: Conrad Hilton.

American Hoist & Derrick Co. Booth 505 (A). Two machines: A Model 395 BT 30-ton truck crane, plus a Model 795 C crawler crane. Both machines will be open for inspection by visitors.

American Manganese Steel Division. Booth 236 (SHU). Dippers, hoe-buckets, hardfacing alloys, welding machines. In attendance: G. Ward; J. Brandenburg; W. E. Crocombe, Jr.; Nelson McClaire; H. Brown Reinhardt. Hotel headquarters: Bismarck.

American Tractor Corporation. Booth 827 (Don.).

Anchor Coupling Co., Inc. Booth 321 (NHU).

Armco Drainage & Metal Products, Inc. Booth 419 (NHD).

Athey Products Corporation. Booth 701. Three road building and material handling machines: Athey PR21 rear dump trailer, Pr15 rear dump trailer and 125 HiLoader.

Austin-Western Works. Booth 702 (EH). New Super 99 power grader, 88-L power grader, hydraulic crane, tandem and 3-wheel rollers and new Model 60 motor sweeper.

Baldwin-Lima-Hamilton Corporation. Booth 506 (A). Type 1250 3-yd. shovel and Type 50 truck mounted crane. In addition to the shovel units the company will display the Austin-Western 101-SE closed circuit diesel electric portable crushing and screening plant and the Lima Roadpacker. The crusher plant and Roadpacker at Austin-Western Booth 702, Area "D".

Barber-Greene Co. Booth 722 (EH). Over ten varieties of Barber-Greene road construction and materials handling equipment, animated displays, working models, etc. In attendance: Total list will contain over 30 names. However, in principal charge will be: E. H. Holt, vice president and director of sales; J. D. Turner, vice president and director of publicity and promotion. Hilton and Sheraton.

Barco Manufacturing Co. Booth 210 (SHU). Barco Vibra-Tamp for granular material compaction including asphalt. Barco rammer for soil compaction. Barco gasoline hammer for demolition. In attendance: J. L. Nordine; L. P. Oelschlager; J. E. Scott; W. S. Withers. Conrad Hilton.

Bay City Shovels, Inc. Booth 507 (A). Bay City Model 190T61 Crane Mobile equipped with 65-ft. of boom and a three-sheave 25-ton capacity hook-block. In attendance: Frank K. Phillips, vice president, sales; George Franks, sales manager. Conrad Hilton.

Blaw-Knox Co. Booth 727 (EH). Concrete spreader, manual and air-operated concrete buckets, automatic aggregate batching plant setup. P-150 base paver, road widener, Model PF-45 black top paver, Model PF-90 bituminous paver-finisher, dual compression trench roller, truck mixer Model M55, clamshell buckets. In attendance: Paul J. Wolfert, general sales manager; Lyle H. Devilling, sales manager; George M. Moritz, sales promotion manager; J. R. Bunder; James Cougler, R. E. Hoppenbath; H. C. Peters, sales product manager. Hotel headquarters: Conrad Hilton.

Wm. Bros Broiler and Mfg. Co. Booth 415 (NHD). Location between Florida and Pennsylvania Turnpike on Second Ave. (In Arena). Bros Preparator (In-place materials reducer). Bros Roto-Mixer (Road materials stabilizer). Bros Strike-off Blade. Bros SP-54 (Self-propelled rubber tire roller). In attendance: A. O. Williamson, Henry Cremisino, Mike Kirwan, Bob Hasbruck, Dudley Hall, Gil Maloney, Tom Kelly, Tex Hollimon, Charles Gellerman. Conrad Hilton.

Bucyrus-Erie Co. Booth 514 (A). New 30-B dragshovel; new 30-B dragshovel; new 30-B transit crane and H-5 Hydrocrane with clamshell. One model of completely new dragline bucket line (the 3-yd.). In attendance:

Various executive sales representatives. Hotel headquarters: Conrad Hilton.

Buffalo-Springfield Roller Co. 508 (A).

L. Burmeister Co. Booth 847 (Don.). New Porto-Plant, a portable concrete batching plant with the capacity and accuracy of a permanent plant. Portable belt conveyor on wheels, and portable Burmeister WeighMeister batching unit. In attendance: Walter Stuller, Orton Spanley, Arnold Ross and Donald Zipter. Hotel headquarters: Conrad Hilton.

Butler Bin Co. Booth 801 (Don.) New Butler BB-4 automatic batching system, consisting of four new Butler bins for stone, sand and cement each with four automatic batchers. In attendance: M. R. Butler, Sr.; M. R. Butler, Jr.; K. P. Kerr, V. J. McLean. Hotel headquarters: Conrad Hilton.

J. I. Case Co. Space 827 (Don.). New utility wheel tractor with front end loader and backhoe, 310 utility tractor with Model 30-H hydraulic mower, Model A-125 air cooled engine, Model 419 water cooled engine, 509 diesel.

Caterpillar Tractor Co. Booth 701-720 (EH). 9 crawler tractors, 6 rubber tired tractors, 3 Traxcavators, 2 motor graders and 10 engines, all fully equipped, also included will be cutaways of a No. 470 Lowbowl scraper, the 8-A and 8-S bulldozers and four of the engine models. Prominent in the exhibit will be the Cat D-9 tractor, one direct drive model will be equipped with 9-S bulldozer. Another direct drive model will be equipped with a 9-V bulldozer and a Hyster D-9A winch. A torque converter model will bear a push cup and the new No. 9 ripper. The Gyro Dozer will be shown on a D-7 tractor. Also shown will be a D-7 mounted with a Fleco D-7 pull stumper and a 7-S tree cutter.

Preco automatic blade control mounted on a Cat No. 12 motorgrader will be demonstrated. Attachment displays will include a 45 bulldozer with Preco back rip teeth and an 8-U bulldozer with cut-away push arms. In attendance: Gail E. Spain, vice president; W. K. Cox, sales production manager; L. L. Morgan, assistant production manager; S. V. Jacobs, manager sales development; C. B. Leber, manager sales training; B. M. Powell, manager of advertising; W. S. Zeigler, manager domestic sales; T. O. McDonald, manager export sales. Hotel headquarters: Sherman.

Chain Belt Co. Booths 724 and 346 (EH). Complete Rex road builders package formed by Chain Belts' recent acquisition of General Roads Machines, Inc. Equipment shown includes 1957 Model Rex paver, Rex spreading, finishing and curing machines. Also shown will be Rex Adjusto-Wate Moto Mixers and Pumpcrete machine. In Booth 346 will be complete line of Rex chains and sprockets and Shafer self-aligning roller bearings. Also included will be Rex conveying equipment.

C. H. & E. Manufacturing Co. Booth 403 (NHD).

Chevrolet Motor Division (Truck Department). Booth 620 (SHD). Two representative models of 1957 Task Force truck fleet, including a model 10403, equipped with a tandem option and a 4½ to 5½ cu. yd. cement mixer body and a model 5103 (LCF) equipped with a 2½ yd. dump body. Chevrolet's exclusive Powermatic transmission and 210 horsepower super loadmaster engine have been assembled in a colorful "cut-away" exhibit which shows these units in action while coupled to an 18,000 lb. rear axle. Detailed literature on the new truck fleet will be distributed at the show. In attendance: H. F. Blankenship, assistant manager, Chevrolet Truck Department; R .E. Larson, regional truck manager; D. A. Weaver, zone truck manager.

Chicago Rawhide Manufacturing Co. Booth 224 (SHU).

C.I.T. Corporation. Booth 354 (NHU).

Clark Equipment Co., Construction Machinery Div. Hall, Booths 823, 829 & 837 (Don.). 16 models of the Michigan line of earthmoving and material handling equipment consisting of 8 models Michigan tractor shovels ranging in capacity from 16 cu. ft. to 6 cu. yd., 3 Models of Michigan tractor dozers 165 hp - 375 hp., 3 Models of Michigan tractor scrapers from 10½ cu. yd. - 27 cu. yd., 2 Models of Michigan tractor loggers and the Models T-20 15-ton and Model T-25 25-ton truck cranes. In attendance: Construction Machinery Division field and home office sales personnel. Hotel headquarters: Conrad Hilton.

Cleaver-Brooks Co. Booth 325 (NHU). Displaying a new 125 hp portable steamer, new Peak Temp oil booster, and a new 50 hp portable steamer. The 125 steamer is for jobs where large quantities of steam must be supplied fast. The 50 hp unit is designed to do twice the work of previous heaters. Headquarters, Sheraton.

Clement-Braswell, Inc. Booth 343 (NHU).

Cleveland Graphite Bronze Co. Booth 350 (NHU). Heavy-Wall bearings for use in diesel and gas engines, compressors, speed reducing gears sets and other heavy duty applications.

The Cleveland Trencher Co. Booth 417 (NHD). Four Cleveland trenchers: Two wheel-type Models 140 and 92, the new ladder type L-270 and the Model 80W sidecrane-backfiller-tamper.

Clipper Manufacturing Co. Booth 223 (SHU).

Construction Machinery Co. Booth 618 (SHD). Transcrite truck mixer with two working models simulating actual on the job performance. Also models from contractor's pumps and high pressure pump line.

Continental Motors. Booth 329 (NHU). New diesel engine.

Cook Bros. Equipment Co. 410 (NHD).

Crane Carrier Corporation. 833 (DH).

The F. D. Cummer & Son Co. Booth 340 (NHU). Large photographs of modern and oldtime Cummer asphalt plants. Literature and catalogs will be available for distribution.

Cummins Engine Co., Inc. 619 (SHD).

Cyclone Filter Corporation. 44 (SHU).

D. A. Lubricant Co., Inc. 421 (NHD).

Dana Corporation. Booth 234 (SHU).

Dart Truck Co. Booth 839 (Don.).

Davey Compressor Co. 812 (Don.).

John Deere Industrial Division. Booth 835 (Don.). Utility wheel tractors in 21 and 30 engine horsepower, wheel type wheel tractor with 67 belt horsepower, crawler tractors with 30 engine horsepower, heavy duty crawler loader and scarifier; also allied equipment such as dozers, trenchers, back hoe. Animated display of the John Deere direction reverser will demonstrate the time-saving advantages of this new John Deere tractor feature.

Detroit Diesel Engine Division of General Motors. Booth 718 (EH). Two new Detroit Diesel Series 71 Turbopower engines and new Detroit Diesel 6-110 Roots Blower engine, Detroit Diesel 4-51 Power Unit, Detroit Diesel 125 KW Diesel-Electric Set, Construction equipment scale model carousel exhibit. In attendance: Clyde W. Truxell, general manager; Robert E. Hunter, general sales manager; T. L. Guarniere, merchandising manager; D. J. Clymer, advertising manager, regional managers, office and field personnel. Hotel headquarters: Conrad Hilton.

Diamond Iron Works Div. 837 (Don.).

R. E. Dietz Co. Booth 356 (NHU). Will feature world's first transistorized electronic highway warning flasher, both barricade type with 360-deg. 2-faced heads and traffic cone type with 360 deg. head. Raymond Burrows, sales manager, in attendance.

Dollinger Corporation. 207 (SHU).

Dotmar Industries, Inc. Booth 305 (NHU). In attendance: A. B. Supject, J. A. Carmody, Jr., A. J. Kresge. Hotel headquarters: Conrad Hilton.

Drill Carrier Corporation. Booth 348 (NHU).

Eagle Crusher Co., Inc. Booth 606. Latest model crusher, 4 cage pulverizer, Hammermill. In attendance: Ralph A. White. Hotel headquarters: Conrad Hilton.

Eagle Iron Works. Booth 200 (SHU). Electric flow diagram of plant, showing Eagle aggregate processing system. In attendance: Claire Laird, Harold White, Jack Twyman, John MacFarland, Jr., Sam Ford. Hotel headquarters: Conrad Hilton.

Eastman Manufacturing Co. Booth 359 (NHU).

The Eimco Corporation. Booth 617 (SHD). New front end loader, tractor shovel, bulldozer.

Electric Steel Foundry Co. Booth 404 (NHD).

Electric Wheel Co. Booth 204 (SHU).

Erie-Strayer Co. Booth 322 (NHU).

E. D. Etnyre & Co. Booth 710 (EH).

Euclid Division, General Motors Corporation. Booths 400, 402, 416 (NHD). Exhibit has 18 earth moving units, including two new 24 cu. yd. scrapers, new model SS-18 scraper, model S-7, 7 cu. yd. scraper, model S-12, 12 cu. yd. scraper, two crawler tractors, five rear dump hauling units, and two bottom dump units.

Fiske Bros. Refining Co., Lubriplate Division. Booths 48, 49 and 50 (SHU).

Fleco Corporation. Land clearing equipment including Fleco D9 rake, Fleco rake, Cat D7 tractor equipped with Fleco stump puller and Fleco tree cutter.

Tractor and Implement Division Ford Motor Co. Booth 312 (NHU). Model 850 all-purpose tractor, in combination with the Ford adjustable rear blade, and the Ford "yard-a-minute" front-mounted industrial loader. Model 850 all-purpose tractor, in combination with the Ford adjustable rear blade, and the Ford "yard-a-minute" front-mounted industrial loader. Model 630 special utility tractor, with hydraulically operated front-mounted Ford angle dozer blade and rear-mounted Ford rotary mower. Fordson Major diesel tractor with fully-mounted 125 cfm two-stage air compressor and air-powered front-mounted rock drill. A variety of air tools for use with this unit also will be displayed.

Fruehauf Trailer Co. Booth 615 (SHD). Three new pieces of equipment: 35-ton carryall with removable gooseneck; 20 ft. tandem axle Fruehauf-Schonrock cable-dump unit, and a bulk cement trailer, 18 ft. long, featuring "airslide" principle of unloading.

Fuller Manufacturing Co. Booth 221 (SHU). Forgings, axles, transmissions. Jack E. Cooper is manager of exhibit. Hotel headquarters: Ambassador.

The Galion Iron Works & Mfg. Co. Booths 711, 726 (EH). T-700 Grade-O-Matic motor grader, Roll-O-Matic, 14-20 ton, 3-axle tandem roller, Models T-600 Grade-O-Matic, 118 and 505 motor graders, 8-12-ton tandem, 12-15-ton "Chief" 3-wheel Roll-O-Matic rollers and 4-6-ton tandem roller with retractable wheels.

Garrison Manufacturing Co., Inc. Booth 111 (SHU).

Gatke Corporation. 51 & 52 (SHU).

General Motors Corporation, Truck & Coach Division. Booth 406 (NHD).

General Roads Machines Division, Chain Belt Company. 724 (EH).

Gillette Publishing Company. "Roads and Streets" Magazine, "Rural Roads" Magazine, "Street Engineering" Magazine, "World Construction" Magazine, "Caminos Y Construction Pesada" Magazine. Booth 214 (SHU).

Gilson Brothers Co. Booth 215 (SHU).

The Gledhill Road Machinery Company. Booth 335 (NHU).

Good Roads Machinery Corporation. Booth 314 (NHU).

The Gorman-Rupp Co. Booths 518 and 600 (A). Completely new line of contractors' pumps. Exhibit will feature a high tower pumping demonstration, showing a vertical priming lift of approximately 30 ft. In attendance: J. C. Gorman, H. E. Rupp, K. H. Cadigan, G. Hiett, J. C. Gorman III, W. E. Rupp, T. C. Bauck, Ford D. Brown, G. W. Erbe, R. M. Fraser, G. J. Kirwan, R. L. Nicolai, D. L. Sanders, R. L. Sears, Hotel headquarters: Conrad Hilton.

W. E. Grace Manufacturing Co. Booth 336 (NHU). Grace 11 M self propelled pneumatic roller, Grace chip spreader, New Model K sweeper, traction driven. In attendance: Floyd Barton, W. E. Grace. Hotel headquarters: Hilton Shore Drive Motel.

The Hanson Clutch & Machinery Co. Booth 805 (Don.). Section E Donovan Hall, Booth 805. Heavy duty ½ cu. yd. crawler mounted diesel powered Model 454 equipped as trench hoe, ¾ cu. yd. 20-ton capacity Model TM-654 truck mounted crane. In attendance: R. A. Bernard, J. E. Warnement. Conrad Hilton.

Hardy Scales Company. Booth 220 (SHU).

Harnischfeger Corporation. Booths 510 and 609 (A and SHD). New Model P & H 575A 40-ton capacity truck crane. P & H Model 1055 3½-cu. yd. excavator-crane. In attendance: J. F. Catalane, general sales manager, Construction & Mining Division; R. P. Jones, assistant general sales manager, Construction & Mining Div.; R. F. Herr, president, Harnischfeger Export Corporation; M. E. Siedschlag, vice president, Export Corporation; and Charles Parthum, advertising & sales promotion manager. Conrad Hilton.

The Heil Company. Booth 806 (Donovan Hall).

Heltzel Steel Form & Iron Co. Booth 719 (EH). Display type 100, type 200 and E-3 batching plants, also working model of the Flex-plane Detroit Special Self-Widening finishing machine, and all forms. At a separate location: exhibit of a Flex-Plane Spreader, Flex-Plane combination float-finisher machine, and an automatic spray machine. Attending: Carl J. Heltzel, pres.; Robert E. Heltzel, v. p.; W. V. Gilronan, sales manager; R. C. Parrett, office sales manager; H. C. Wetzl, field sales manager (Heltzel), Gordon R. Graves, field sales manager (Flex-Plane) and W. J. Kirchner, chief process engineer. Conrad Hilton, Ambassador West.

Hendrix Manufacturing Company. Booth 351 (NHU).

Henry Manufacturing Company (with Deere & Company).

Hercules-Galion Products, Inc. Booth 423 (NHD). Will be of institutional type playing up overall corporation and its 5 factories located at Hercules Steel Products, Galion, O.; Galion Allsteel Body Co., Galion, O.; Mansfield Metal Products, Mansfield, O.; Uni Steel Body Co., Wapakeneta, O. and Kingham Trailer, Louisville, Ky. In attendance: D. J. Redmond, director of sales; E. E. Smalley, manager sales promotion Hotel headquarters: Conrad Hilton.

Hercules Motors Corporation. Booth 108 (NHD). New line of interchangeable gasoline and diesel engines in 3, 4 and 6-cylinder sizes, and in 25 models. New Hercules power units also will be shown. In attendance: T. S. Klinedist in charge.

Hetherington & Berner, Inc. Booth 411 (NHD).

Highway Equipment Co., Inc. Booth 347 (NHU). Hi-Way Model DD tailgate spreader (both standard & delux), Hi-Way Model E motor driven spreader, Hi-Way Model R pull-type spreader, Hi-Way Model J sand, cinder and chip spreader, New Leader Model AS asphalt spreader, New Leader Model L pull-type chip spreader. In attendance: Bill Gaddis, vice president; Harry Wendler, general manager; Cliff Farrell, sales manager. Hotel headquarters: Conrad Hilton.

H & L Tooth Company. 820 (DH).

Homelite a Division of Textron, Inc. Booths 401 and 500 (NHD and A). Homelite's complete line of pumps, generators, chain saws, and electric tools. New pressure and diaphragm pump (demonstrated) will be featured in the pump section. Foremost in portable generator section will be a new 90 lb. 1500 watt generator. A new Model 7-29 chain saw will be shown. Highlight of exhibit will be a 15-ft. pump tower designed to demonstrate fast priming action of Homelite pumps. In attendance: Homelite salesmen, sales executives, and equipment specialists. Hotel headquarters: Oak Park Arms Hotel, Oak Park.

Frank G. Hough Co. Booths 711-726 (EH). Models HA, Hu, HH, HO Payloader tractor shovels. Will also show cut-a-ways of major components. In attendance: Entire sales staff and members of service parts and advertising departments.

Huber-Warco Co. Booth 714 (EH). Huber-Warco 5D-190 motor grader with 195 hp.; a 125 hp. 6-D2 motor grader with torque converter and power shift transmission; a Huber-Warco maintainer with lift-loader attachment; a 3-5-ton tandem roller with torque converter; a 5-8-ton tandem roller with torque converter and two-speed transmission; and a 3-wheel roller with torque converter and two-speed transmission (first public showing of the new 3-wheel roller line). Hotel Conrad Hilton.

Hyatt Bearings Division, General Motors Corp. Booth 303 (NHU)

Hyster Co. 701 (EH). New Hyster D4 hydraulic backhoe, D9A towing winch said to be the world's largest, D61V towing winch, D7D towing winch, Hyster "Hystaway" with dragline, Hyster "Grid" roller.

Hy-Way Machinery, Inc. Booth 843 (Donovan Hall).

Ingersoll-Rand Company. 712. (EH).

International Harvester Co. Booths 711-726 (EH). Eight truck models especially adopted to highway construction work. Also "live" cut-away views of new V-8 engine, an exposed 6-wheel drive chassis, a moving 6-wheel "bogie-action" unit, and a diesel engine cut-away. The IH Construction Equipment Division will display its well-balanced line of road-building equipment, with units ranging from the T-6 crawler up through the off-highway haulers. Of special interest to many will be International's new, off-highway haulers, the Models "65" and "95" Payhauler trucks, new in 1956. The company's full complement of new "Bonus-Powered" crawler tractors, topped by the TD-24, will be shown, plus the matched line of IH crawler blades. Also on display will be International Drott skid shovels and the versatile 4-in-1, new Hough Payloaders, and other IH equipment. The rubber-tired line will be represented by the highly maneuverable, work-proved Payscraper Models "55" and "75" two-wheel, high-speed earthmovers.

Iowa Manufacturing Co. Booth 723 (EH). Crushing and screening plants, crushers, screens, bituminous pavers. New triple deck screens, new stabilized base mixer and new bituminous paver (shown for the first time.)

Jackson Vibrators, Inc. Booth 310 (NHU). Vibratory soil compactors. In attendance: A. W. Davis, vice president; Garfield T. Peterson, Milton Huges and Merrill Huges, field engineers.

The Jaeger Machine Co. Booth 704 (EH). New Self-widening Type J finishing machine, a model CSS concrete spreader, new Model SPS-3 aggregate spreader, new Model SPS-6 spreader, 1957 model truck mixer, and latest models of Jaeger line of rotary air compressors.

Jay Company, Division of J. Leukart Machine Co., Inc. Booth 213 (SHU).

The Jeffrey Manufacturing Co. Booth 338 (NHU). Chains and sprockets for use in construction machinery. In charge: A. T. Loew, manager, O. E.M. sales. In attendance: L. E. Brill, manager of sales, Merchandise Div. Hotel headquarters: Harrison.

Joy Manufacturing Co. Booth 800 (Don). Three new sizes of Airvane rotary compressors. Rock drilling equipment, including the Challenger, a self propelled drill unit mounting a 5¼ in. hammer drill, the Junior Challenger self propelled on crawler treads mounting a 4½ in. drill and a self propelled wagon drill.

Kalamazoo Division, The New York Air Brake Co. Booth 370 (NHU).

Kensington Steel Co. Booth 840 (Don). Manganese steel replacement parts for contractors equipment such as: Crusher and puverizer parts. Crawler treads, sprockets and rollers for most popular types of excavators, cranes, etc. Conveying and elevating chains and sprockets. Tractor tread mechanism (in operation) consisting of heavy duty design of rail links, grouser plates and sprocket rims. In attendance: H. M. Albers, E. C. Anderson, E. A. Lerner, L. T. Harris, R. J. Williams, J. F. Milmine, C. J. Steinbrecher.

Koehring Company. Booth 512 (A). Divisions and Subsidiaries Koehring-Parsons, Johnson-Kwik-Mix. Spaces 512 and 725. Koehring Co. display excavating, hauling, mixing and material handling equipment. Kwik-Mix complete line of concrete, bituminous mixers, also Moto-Bug power wheelbarrow. C. S. Johnson Co.: portable aggregate and cement handling equipment. Parsons Co.: rubber tire mounted trencher; also crawler mounted wheel and ladder type trenchers. E. J. Goes is in charge of exhibit.

King Publications "Western Construction" Magazine. 209 (SHU).

Kohler Co. Booth 309 (NHU). Engines: K-90, K-160, K-330, K-660. Electric Plants: 10R0461, 2.5M25, 2RMH21, 1.5M25, 500Le1. In attendance: F. W. Nelson; A. G. Kroos, Jr.; J. O. Kohl; R. I. Brueckbauer; R. W. Rensis; G. W. Wood; A. N. Butcher, Jr.; W. W. Olson; R. Parnitzke; P. Dankwardt. Hotel headquarters: Conrad Hilton.

Leschen Wire Rope Division, H. K. Porter Co., Inc. Booth 300 (NHU). An illuminated background of photographic enlargements of both industry and plant pictures. Numerous samples of the various types, sizes, and construction of Hercules Red-Strand wire rope used in road building operations. Also on display a number of Red-Strand wire rope slings. In attendance: D. W. Vernon, vice president & general manager; L. J. Clarke, general sales manager; G. N. Dow, Chicago dist. manager.

R. G. LeTourneau, Inc. Booths 841 and 418 (Donovan Hall & NHD).

LeTourneau-Westinghouse Co. Booth 705 (EH). Nine machines including rubber tire tractors, scrapers, haulers, self propelled loaders, motor graders and new units which will be introduced for the first time. There also will be animated displays and photographs. In attendance: 15 men will be on duty at all times. Included as well as sales personnel will be service engineers, field engineers, export and advertising department representatives. Hotel headquarters: LeT-WesCo domestic headquarter Conrad Hilton Hotel, LeT-WesCo export division—Morrison Hotel, Westinghouse Transit Mixer Division—Sherman Hotel.

Link-Belt Speeder Corporation. Booth 509 (A). Complete HC-98 truck crane (30-ton capacity). Crawler base for 1 yd. Model LS-98. Upper machinery (with cab removed) for "98" series shovel-cranes. Cut-a-way working model of exclusion Speed-O-Matic power hydraulic control systems which is standard on all models. In attendance: Management, home sales personnel, district representatives and engineers.

Littleford Bros., Inc. Booth 622 (SHD). Model 700 Trail-O-Patcher and sand dryer, Spray Master distributor with mechanical spray bar, Littleford-Clarkmoore heater-planer, True-Lay paver-spreader, Portable tandem roller Model 160, 200 gal. kettle with hand spray attachment. In attendance: L. W. Glasser, sales manager; D. Carter, assistant sales manager; R. P. Miere, equipment manager.

The Lufkin Rule Company. Booth 301 (NHU).

Mack Trucks, Inc. Booth 803 (Don). Model LRSVW 34-ton off-highway dumper truck, Model LVX 22½-ton four-wheeled off-highway truck, Model B813SX 7½-cu. yd. off-highway six-wheeled mobile mixer, Model B42sx six-wheeled dump truck with an 8-yd. body. In attendance: A. G. Crockett, Ken Fitts, Merrill Horine and other Mack officials. Hotel headquarters: Park Dearborn.

MacLean-Hunter Publishing Corporation "Rock Products" Magazine. Booth 201 (SHU).

Macwhyte Co. Booth 211 (SHU). Ropes, slings, swaged fittings, including a reel of scraper rope, specially designed for carry-type scrapers and bulldozers.

Massey-Harris-Ferguson, Inc. Work Bull Division. Booth 810 (Don). 202 Tractor, 202 Fork Lift, 303 Tractor w/¾ cu. yd. loader, 404 Tractor w/¾ cu. yd. loader & back hoe, Pit Bull shovel loader w/⅞ cu. yd. bucket. In attendance: B. R. Bermann, manager, Work Bull Division; R. M. Drew; A. M. Geary; J. W. Larkin.

Master Vibrator Company. Booth 330 (NHU).

The McCarter Iron Works. Booth 337 (NHU). Improved and substantially redesigned McCarter M-5000 and M-6000 batch plants.

McGraw-Hill Publishing Co., Inc. Booth 223 (SHU).

McKiernan-Terry Corporation. Booth 608 (SHD). Pile driving equipment featuring steam pile hammers, steam generators, pile extractors, sand drain equipment, newly designed light weight pile hammer leads and the new DE20 diesel pile hammer requiring no prime movers, no line, no auxiliaries, with built in fuel and lubrication tanks for three day's operation. In attendance: G. R. Compton, Jr., vice president in charge Pile Hammer Division; R. H. Nelson, assistant manager, sales & service P. H. Division; W. H. Guest, service manager McKiernan-Terry Project Engineers. Conrad Hilton.

Marion Power Shovel Co. Booth 504 (A). 43-M Hoe, a fully convertible, crawler mounted 1 yd. excavator; 35-M shovel, a new crawler mounted ¾ yd. excavator; 35-M truck crane, newest model in Marion line. In attendance: M. T. Smith, president and general manager; A. F. Busick, vice president engineering; D. E. Rizor, vice president; Robert Campello, general sales manager; B. P. Cooper, export manager; Martin Tuttle, general works manager; D. B. Reed, Jr., director of advertising and public relations; R. P. Sullivan, manager of service and erection. A number of Marion sales and service representatives also will be in continuous attendance.

Minneapolis-Moline Co. Booth 226 (SHU). First showing of new crawler tractor and new 335 and 445 industrial wheelers and the MM line of power units. Also shown will be cross section views of the new industrial wheelers and cut-away models of new MM Ampli-Torc transmission and power steering.

Mixermobile Manufacturers, Inc. Booth 819. (Donovan Hall).

Morse Chain Company. Booth 822. (Donovan Hall).

M-R-S Manufacturing Company. Booth 414 (NHD).

Municipal Supply Co. Booth 313 (NHU). Avenue C. New bituminous distributor and new Model A maintenance distributor.

Murphy Diesel Company. 614 (SHD).

N. P. Nelson Iron Works, Inc. Booth 412 (NHD).

The New York Air Brake Company, Kalamazoo Division. Booth 370. Various types of hydraulic pumps, fluid motors, control valves and cylinders that are designed especially for earth moving and construction equipment. An exhibit showing equipment run with dirty hydraulic fluid as compared to clean fluid will be set up and there will also be a service clinic put on several times a day. In attendance: R. J. Murphy, sales manager; Walter Root, manager sales promotion and advertising; R. B. Jamieson, exhibit manager; E. J. Hrdlicka, general manager and others.

Nordberg Manufacturing Co. Booth 306 (NHU). Exhibit will feature the full line of Nordberg and Symons machinery for the cement and aggregate industries.

Northwest Engineering Co. Booth 502 (A). The Model 80-D 2½-yd. shovel will be typical of the equipment on display, which will include some new units. In attendance: Ralph Cornellisen, vice-president in charge of sales, and George Williams, advertising manager.

Oshkosh Motor Truck, Inc. Booth 607 (SHD). 1 Model 50-50, 4 x 4 Concrete Carrier, weight 10,600-lb., 36,000-lb. G.V.W., Continental 427 cu. in. gasoline engine; Vickers power steer, Bostrom level-ride drivers seat. 1 W-2801, 120,000-lb. G.V.W., 34,300 lb. chassis weight, truck; Hall-Scott 1091-B-1 Butane engine; Allison transmission & torque converter. In attendance: J. R. Settle, Lee A. Miller, O. B. Zimmerman, Alan M. Marker. Conrad Hilton.

The Oliver Corporation. Booth 807 (EH). Super 99 Speed-Haul scraper, OC-18 crawler tractor, OC-12 crawler tractor, OC-4 crawler tractor, Super 55 wheel tractor, Super 77 wheel tractor, Super 88 wheel tractor, all equipped with matched equipment. Officials in attendance: E. H. Fisher, vice pres., S. W. White, Jr., vice pres., R. G. Hurlburt, Asst. Sales Manager. Hotel headquarters: Conrad Hilton.

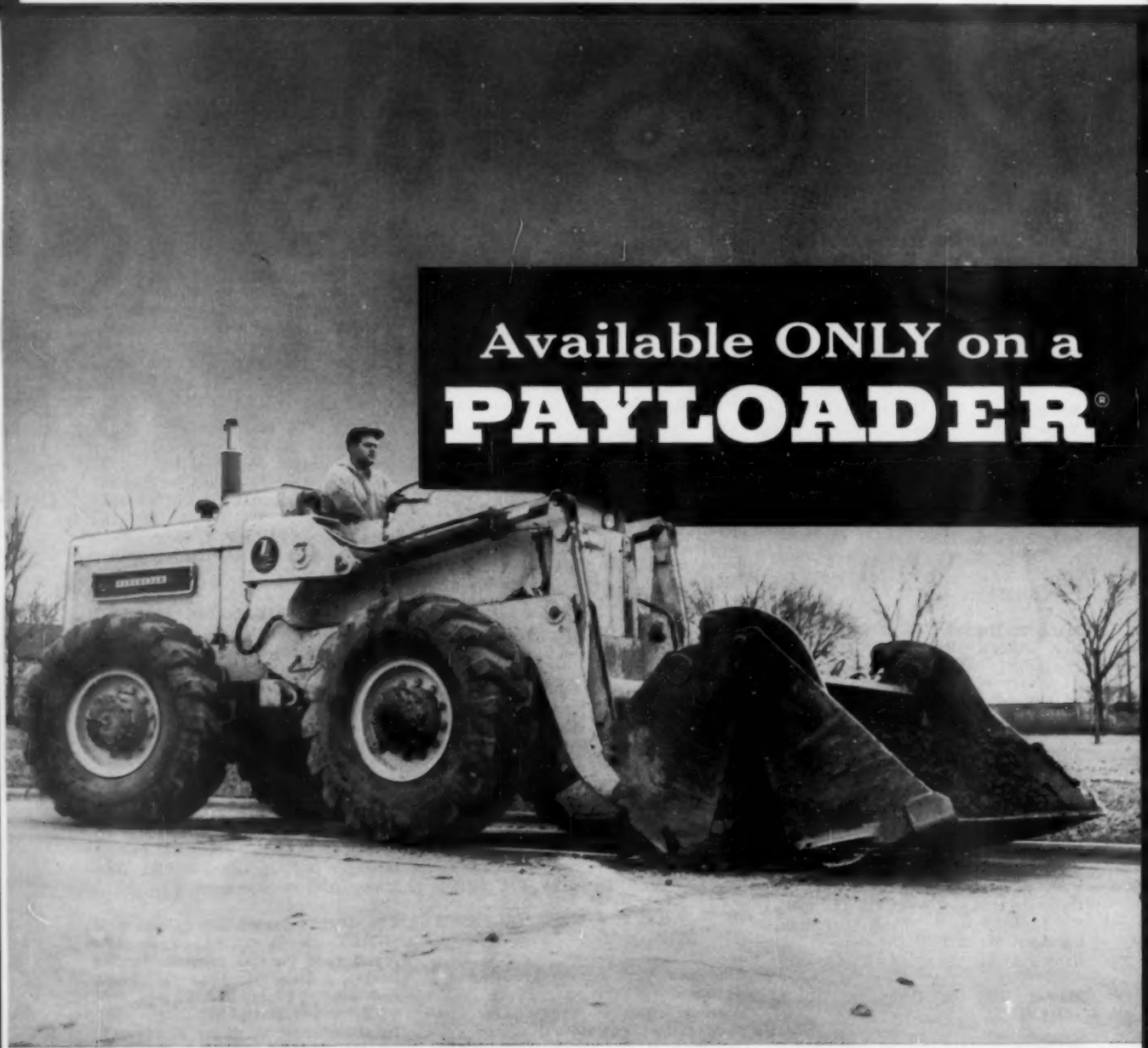
D. W. Onan & Sons, Inc. Booths 11 and 12 (SHU). First showing of new gasoline engine driven air conditioners for truck cabs, also will be exhibited line of engine driven electric generating plants, both gasoline and diesel driven. In attendance: Hiram Hascall, vice president sales; George Burda, sales promotion manager; Julius Grabow, assistant sales promotion manager; Corwin Wood, zone manager; Paul Richardson, regional manager; Frank Ciernia, regional manager; Perry Copeland, manager O E M sales; Robert Westrum, sales engineer.

The Owen Bucket Co. Booth 361 (NHU). A ¾-cu. yd., Type "M" round nose general purpose digging bucket, a 1-cu. yd., Type "D" heavy duty digging bucket and the new Type "SCL" wide material handling bucket. In attendance: William F. Marsteller, Jr. and John P. Botten. Hotel headquarters: Conrad Hilton.

Perfection Steel Body Company. Booth 606 (SHD).

Pettibone Mulliken Corporation. Booth 813 (Don). Pettibone Speedall Model 250D tractor shovel, Pettibone speed swing Model AW PD, Pettibone Wood roadmixer Model 54-S, Pettibone Wood speed mixer, Pettibone Wood preparizer Model P-630, Pettibone speedmatic grader Model PM-612, Pettibone buckets, dippers and dragline buckets, Pettibone Haiss bucket loader Model 135 AW. Products of George Haiss' Manufacturing Co., Pettibone Wood Manufacturing Co., and Universal Engineering Co., subsidiaries of Pettibone Mulliken Corporation all combined in one exhibit. In attendance: Complete organization. Hotel headquarters: Conrad Hilton.

(Continued on page 104)



DROTT 4-in-1 buckets

The Frank G. Hough Co. is pleased to announce that another valuable attachment has been added to those available exclusively for "PAYLOADER" tractor-shovels. This is the Drott 4-in-1 bucket which, coupled with the power and mobility of the current line of 4-wheel-drive "PAYLOADER" tractor-shovels, gives them greater performance on many jobs, and the ability to handle many operations that usually require special machines.

More than ever before, you get more tractor-shovel when you buy a "PAYLOADER", because you get more tractor-shovel performance and more versatility. They have power-transfer differentials — an exclusive "PAYLOADER" feature that maintains effective traction on mud, gravel, ice and snow. They have no-stop power-shift transmissions and torque converters . . . planetary final drives . . . power steering and 4 wheel power brakes. They have the exclusive bucket motion with 40° tip-back and powerful pry-out action that enables them to dig more, carry more and deliver more . . . to outperform any comparable tractor-shovels.

Your "PAYLOADER" Distributor is anxious to demonstrate what these "PAYLOADER" tractor-shovels and Drott 4-in-one buckets can do for you.

SHOVEL

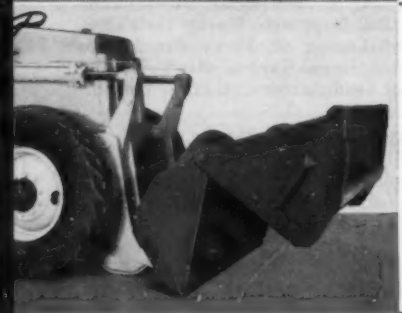
The four-in-one bucket can always be used as a regular tractor-shovel bucket to dig, carry and dump in the regular manner.

CLAMSHELL

Use the powerful clamshell action to clean up small piles, to pick up without tractor travel, to grasp and handle stumps, pipe and timbers fast.

SCRAPER

With slight clam lip opening you have a carry-all scraper that heap-loads itself, carries and spreads thin layers or dumps completely. Strips sod and grades with real accuracy.



BULLDOZER

Open the clam lip full, and you have a sturdy bulldozer with hydraulic fingertip blade-pitch control to regulate dozing depth and to discharge sticky material.

help you handle more jobs

OTHER USEFUL ATTACHMENTS

Hydraulic Back-hoes	Land-clearing Rakes
Crane Hooks	Scarifier Teeth
Fork Lifts	Special Buckets
Pusher Plates	Pick-up Street Sweepers
Winches	Rotary Snow Plows
Log and Lumber Grapples	"V" and Blade Plows

The knowledge and experience gained in 35 years, building thousands of tractor-shovels — more than all others combined — is your assurance of superior design, engineering and value when you invest in a "PAYLOADER" tractor-shovel.

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.
768 Sunnyside Ave., Libertyville, Ill.

Send full data on 4-wheel-drive "PAYLOADER" models with Drott 4-in-1 Buckets as checked:

☐ model HO 2¼ yd. ☐ model HH 1½ yd.
☐ model HU 1 yd.

Name _____

Title _____

Company _____

Street _____

City _____

State _____

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. . . for more details circle 315, page 16

Directory of Show Exhibitors —Continued

Pioneer Engineering Works, Inc. Booth 729 (EH). 102 portable bituminous continuous mix plant. New 4-deck 45VE portable crushing and screening plant. New VIBROmatic bituminous paver. Heavy-duty ORO-feeder 48 in. x 16 ft. In attendance: O. J. Ellertson, Pres., C. C. Rolf, Executive Vice Pres., A. J. Belanger, Vice Pres., Sales, W. A. Rundquist, Vice Pres. Sales Promotion. Hotel headquarters: Conrad Hilton.

Pit & Quarry Publications. Booth 358 (NHU).

Portland Cement Association. Booth 237 (SHU).

Preco Incorporated—(Exhibiting with Caterpillar Tractor Co.)

Public Works Journal Corporation, Public Works" Magazine. 216 (SHU).

Purolator Products, Inc. Booth 202 (SHU). Construction equipment filters including lubrication filters, fuel filters and strainers. Dry type carburetor air filters. Breathers, and vent screens. In attendance: Richard Karr, Martin Stoltz, David Hall, John Puth. Drake Hotel.

Renner Manufacturing Company. Booth 319 (NHU).

Rice Pump & Machine Co. Booth 332 (NHU). North Upper Hall. Centrifugal and diaphram pumps. Hotel headquarters: Conrad Hilton.

Rockford Clutch Division, Borg Warner Corporation. Box 362 (NHU). Section A, North Hall, 2nd Floor. Friction clutches used in some of the world's largest track-laying tractors, etc., Rockford's Morlife. Of special interest is Rockford's latest development: Power-Shift Transmissions for heavy-duty equipment. In attendance: E. R. Williams, A. M. Reibitz, James Crooks, E. A. Richards.

Rodgers Hydraulic, Inc. 368 (NHU).

John A. Roebling's Sons Corporation. Booth 307 (NHU). Wire rope featuring relatively new Royal Blue wire rope. General line electrical wires and cables. Tellurium alloy lead sheath for cables. Tensioning elements for prestressed concrete.

Schield Bantam Co. Booth 731 (EH). Three Schield Bantam ⅜-yd., 5-6-7-ton crane-excavators; Model T-35 carrier-mounted, model C-35 crawler-mounted, model CR-35 self propelled. The various attachments for the machines will be displayed; attachments include: crane, dragline, trench hoe, clam, shovel. Another feature will be an unmounted upper in actual operation to show visitors line speeds and various engineering features. In attendance: V. E. Pray, exhibit manager; Buel M. Wallis, general sales manager; Wilbur Schield, vice-president; eight district managers.

Schramm, Inc. Booth 721 (EH). New Rotadrill on Pneumatractor, standard Pneumatractor, heavy Pneumatractor with 1-cu. yd. on front end loader and backhoe, Pneumatractor model 125 gasoline driven air compressor, and the Model 600 diesel engine driven compressor with super-charged compressor unit. In attendance: George B. Comfort, manager sales promotion; Roy E. Hearl; Richard Bert; P. F. Smith; J. E. Megrogan; J. P. Powell; S. J. Shamow; D. M. Thomson. Hotel headquarters: Conrad Hilton.

Scranton Publishing Company, "Modern Highways" Magazine. 205 (SHU).

Seaman-Andwall Corporation. Booth 320 and 323 (NHU).

Seaman-Gunnison Corporation. Booths 311 and 308 (NHU). The Duo-Products line, including the Seaman-Gunnison Duo-Pactor and Duo-Scraper with interchangeable prime mover. Gunnison bituminous distributor with new heating and circulation system for proventing nozzle-clogging deposits. In attendance: Harry J. Seaman, Don Seaman, Vern Mandt, Phil Pettes, Ed Titus. Hotel headquarters: Conrad Hilton.

Service Machinery Corporation. Booth 849 (Donovan Hall).

The Simplicity System Co. Booth 807 (Don). Donovan Hall. Plant Model. In attendance: W. C. West, D. B. Jones and P. E. Todd. Hotel headquarters: Hamilton Hotel, The Acres Motel.

SKF Industries, Inc. Booth 203 (SHU). New line of anti-friction bearings and pillow blocks for highway construction equipment and Tyson tapered roller bearings. Also new positive method for "center" lubrication of spherical roller bearings and Type "SAF" triple-seal pillow block equipped with improved spherical roller bearings. In attendance: J. L. Bruseo, E. C. Denne, E. H. Wagner, L. E. Jacobs, M. W. Passmore and J. H. Sutherland.

Smith Engineering Works. Booth 604 (SHD). Exhibit will feature large capacity Telsmith portable crushing, screening and loading plants, and large capacity Telsmith stationary aggregate plants. Photographs of various new equipment will be shown, as well as working model Telsmith gyrosphere crusher. H. H. Schaper in charge. Conrad Hilton.

Standard Steel Corporation. Booth 235 (SHU). 6 ft. square photo blow-up of Road-Master 6000 lb. asphalt plant. Also photo blow-up of TM portable plant and views plant installations. In attendance: M. B. Freeman, vice president and manager; Road Machinery Division; W. V. Davidson, assistant sales manager; and field personnel from the midwest.

Standard Steel Works, Inc. Booth 302 (NHU). New 1957 model 424-56 asphalt pressure distributor, Model S.J. bituminous maintenance distributor, Model G5-10 aggregate spreaders, Model 55 2½ ton variable patch roller, Model 55T portable trailer for roller. Special plastic sections of spray bar. In attendance: Jack Neubauer, C. R. Wittig, H. H. White.

Stow Mfg. Co. Booth 339 (NHU). G24, G29, G34, and G46 Roto-Trowels, vibrating screed for road work and bridge decks, "Power Midget" vibrator with 1-¼ in. diameter head, new JT50 portable concrete grinder, electric vibrator with UL approval. AG vibrator, and BG vibrator. In attendance: C. F. Hotchkiss, Jim Dickinson, Bill Rappman, Hocky Hotchkiss, Lloyd Laney, G. Percy Smith, Joe Treyz, Gerry Karlen, Owen Brooks. Hotel headquarters: Conrad Hilton.

Tampo Manufacturing Co. Booth 324 (NHU). Scale models of rollers and complete concrete ready mix plant, also full scale cutaway working model of slurry mixer. Feature will be new self propelled pneumatic tired roller. In attendance: Walter Stevens, president; Cleal Falke, general manager; Gus Worthington, sales manager; Jack Keppler, chief engineer; Vince Hagen, field engineer.

The Texas Company, Asphalt Division. Booth 218 (SHU).

The Thew Shovel Co. Booth 503 (A). Lorain 85A 2½-yd. shovel. Heavy duty ¾ yd. Lorain 26 with hoe boom, 35 ton Lorain Moto-Crane Model MC530WX, New Lorain self-propelled Model SP-107 7-ton crane. The following Lorain advancements also will be demonstrated: 2-lever, air operation controls, new square tubular crane booms, and new shovel crane mounting.

Thor Power Tool Co. Booth 706 (EH). Air and electric portable power tools and equipment featuring the new Thor "DrillCat", a self-propelled, one-man-operated, rock drilling crawler; new BW-2 and SW-1 wagon drills; new Thor electric concrete vibrator; New

The Material and Supply Exhibitors

These firms, with booth numbers and representatives listed, are exhibiting in a special area reserved for them in the South Hall Upstairs.

Abrams Aerial Survey Corporation (103). Robert Ehrenspeiger
Acme Highway Products Corporation (106). S. S. Bryan
Aluminum Company of America (14-20). Ralph L. Hoy
American Bitumuls & Asphalt Company (81-82). K. N. Cundall
American Concrete Pipe Association (25). John A. Ruhling
American Marietta Company (71-74). W. A. Hagemeister
American Sisalkraft Corporation (26). W. A. Hagemeister
Anchor Post Products Company (100). Jos. W. Lewellen
Armco Drainage & Metal Products, Inc. (107). W. H. Spindler
The Asphalt Institute (77-78). Richard C. Dresser
Barrett Div., Allied Chemical & Dye Corp. (9). R. C. Dresser
Bendix Aviation Corporation, Computer Div. (8). L. L. Swartz
Bethlehem Steel Company (55-66). J. E. McCracken
Brown & Blauvelt (13). Robert F. Thurrell, Jr.
Calcium Chloride Institute (24). William F. Reynolds
The Philip Carey Manufacturing Company, Special Industries Department (7). H. F. Turner
Carolina Tire Company (5-6). J. K. Lamb
Cataphote Corporation (67-68). J. E. Fogalle
Columbia-Southern Chemical Corp. (61-62). J. C. Plunkett
G. & W. H. Corson, Inc., (Pos-O-Pac Co. of America) (80).
Food Machinery & Chemical Corporation (88). Edward L. Cole
L. B. Foster Company (59-60). Edward L. Cole
General Electric Company (41-42). Edward L. Cole
The Grote Manufacturing Company (33-34). W. E. Miles
Habitant Fence, Inc. (41). Robert F. Thurrell, Jr.
International Salt Company, Inc. (105). John T. Root
Irving Subway Grating Company, Inc. (32). John T. Root
Kaiser Aluminum & Chemical Sales, Inc. (83-84). John T. Root
Koppers Co., Inc., Tar Products Div. (28-30). W. R. Chesley
Liberty Mutual Insurance Company (10). John Kraus
Marchant Calculators, Inc. (37). Joseph W. Lewellen
Minnesota Mining & Mfg. Co. (89-90; 95-96). P. McCauley, Jr.
Monroe Calculating Machine Co., Inc. (38-39). P. J. Skolly
Monsanto Chemical Company (85-86). P. J. Skolly
Morton Salt Company (87). Harvey Clausen
Motorola Communications & Electronics, Inc. (108). H. Clausen
Nafisco, Inc. (109). John G. Knox
National Crushed Limestone Institute (110). John G. Knox
National Slag Association (70). John G. Knox
Nelson Stud Welding Div., Gregory Industries, Inc. (97-98). S. L. Lapp
Radio Corporation of America (23). A. M. Hilliard
Remington Arms Company (3). A. G. Lane
Reynolds Metals Company (91-94). R. E. Dysart
Servicised Products Corporation (104). Howard Messmore
Sinclair Refining Company (21-22). C. C. Randall
Sonoco Products Company (35-36). C. C. Randall
Sterling Bolt Company (1-2). C. C. Randall
Swing-Lo Suspended Scaffold Company (69). C. C. Randall
Syro Steel Company (53-54). C. C. Randall
Toncan Culvert Manufacturers Asso., Inc. (79). J. W. Lewellen
Universal Sewer Pipe Corporation (75-76). H. B. Bodenhamer
Vibration Measurement Engineers (99). Don M. Gehring
Visking Corporation (60). W. A. Heinemann
Wire Reinforcement Institute (101-102). Donald M. Gehring
Wood Conversion Company (27). Donald M. Gehring

Thor electric generator; new Thor portable power trowel; as well as a complete line of paving breakers, sinker rock drills, clay spades, sump pumps, tampers, and air and electric power tools for construction and maintenance use. In attendance: B. H. Johns, vice president; W. A. Nugent, executive vice president; F. J. Schiel, Chicago manager; J. F. Corkery, sales promotion manager. Hotel headquarters: Conrad Hilton.

Timken Detroit Axle Division, Rockwell Spring and Axle Co. Booth 364 (NHU). A complete line of planetary axles in steering and rigid versions ranging from 11,000 to 75,000. The heavy duty thru drive SFDD-4600 tandem with matching heavy duty FU-900 and center steer front axles. In attendance: W. R. Boerner, W. F. Shirley, G. T. Moore, Special Equipment Sales Engineers. Hotel headquarters: Lakeshore Drive Hotel.

Timken Roller Bearing Co. Booth 816 (Don). Timken roller bearings used in all phases of construction industry. Timken removable rock bits. Construction equipment parts made from Timken fine alloy steel. A simulated rock conformation showing Timken rock bits on drill steel in drilling position.

The Torrington Co., Bantam Bearings Division. Booth 808 (Don). Donovan Hall. Spherical roller bearings and improved designs of radial roller bearings for use in shaker screens and rock crushers. Tapered roller, heavy duty needle roller, ball radial and roller thrust are other bearing types that will be featured, each of which are used in vital applications in road building and maintenance equipment. In attendance: W. F. Shotola, sales Mgr.; R. U. Sautter, Chicago District Mgr.; Edward Rowlett, District Engr.; Jack Wholean, Milwaukee District Mgr.; W. M. Walker, Cleveland District Mgr.; Walter St. Onge, Advertising Mgr.; G. E. Marvel, Ass't. sales Mgr. Hotel headquarters: Bismarck.

Tractomotive Corporation. Booth 601 (SHD). TL-20 Tracto-Loader, 2-cu. yd., 20,000 lb., four wheel drive with torque converter drive and power shift transmission a completely new machine being shown for the first time. Also TL-12 Tracto-Loader 1⅛ cu. yr. 4-wheel drive, torque converter & quick shift transmission and TL-70 Tracto-Loader front wheel drive, torque converter, 1 cu. yd. capacity quick shift transmission. Hotel headquarters: Hotel Morrison.

Transport Trailers, Inc. Booth 344 (NHU). Natural color reproductions of heavy duty trailers for the construction industry. Included will be single, tandem, triple, and trunnion axle low bed construction equipment trailers with and without removable goosenecks; between-the-wheel and over-the-wheel tilt bed trailers; standard and heavy duty platforms; both single and tandem axle; and special trailers with capacities through 100 tons. In attendance: W. C. Ronk, president; E. J. Whisler, vice president in charge of sales; H. W. Jahn, assistant sales manager; J. E. Craft, sales engineer; and other personnel. Hotel headquarters: Conrad Hilton.

Truck Engineering Company (With International Harvester Co.)

Twin Disc Clutch Co. Booth 413 (NHD).

Union Wire Rope Corporation. Booth 315 (NHU). Complete prestressing bed in miniature form, showing how prestressed concrete is made; also complete line of "Tuffy" slings and

fittings; and transparencies of prestressed concrete jobs. Hotel headquarters: Conrad Hilton.

Union Chain Mfg. Co. Booth 208 (SHU). Drive and conveying chains. In attendance: Lawrence D. Rabbitt, J. W. Anderson. Hotel headquarters: Conrad Hilton.

Unit Crane & Shovel Corp. Booth 735 (EH). Unit Model 510C—⅜ yd. excavator (crawler), Unit Model 510T—10-ton truck crane, Unit Model 1014—½ yd. truck crane, Unit Model 1020A—¾ yd. dragline (crawler), Unit Model 617—⅝ yd. shovel (crawler). Complete assembly of gear case in operation. In attendance: William G. Larson, exhibit manager and Clarence Mueller, advertising manager as alternate exhibit manager.

United States Steel Corporation. Booth 516 (Arena).

United Tractor Parts Company. Booth 217 (SHU).

Universal Engineering Corporation (With Pettibone-Mulliken Corp.)

Vickers Incorporated. Booth 219 (SHU). Animations depicting functions of bulldozer, motor grader, crane front end loader and scraper. Multiple unit valve stand. Power steering display. Operable hydraulic display. Cut-a-way models of Vickers pumps, valves, steering boosters, etc. Hotel headquarters: Ambassador.

The E. H. Wachs Co. 821 (DH).

Wagner Tractor, Inc. 819 (DH).

Wain-Roy Corporation. Booths 711-726 (EH). Wain-Roy backhoes mounted on International Harvester TD-9 crawler tractor, International Harvester 300 utility tractor, 4-wheel drive Hough "Payloader". In attendance: V. J. Holopainen, president; K. G. Russell, executive vice president; E. R. Robison, vice president; W. H. Hancock, service manager; J. K. Van Leeuwen, vice president sales. Hotel headquarters: Conrad Hilton.

Walter Motor Truck Co. Booth 616 (SHD). Two Walter 4-point positive drive snow fighters, Models ACUL and ARBL. In attendance: C. A. Mission, president; M. Walter, vice president; George R. Cooper, Jr., secretary; E. C. Bain, Canadian sales representative; P. J. Kjems, Midwestern sales representative.

The Warner & Swasey Co. Booth 815 (DH). Four Gradall multipurpose machines and two new trucks.

Waukesha Motor Co. Booth 231 (SHU). Selection of five engines typical of models used in road building equipment. Larger engines in the line of over thirty different models will be illustrated in the background display, and a feature will be a large illuminated transparenty of the cross-section of the largest Waukesha diesel, the 12-cylinder Model VLRDB, which developes over 1100 hp.

The Weatherhead Company, Fort Wayne Division. Booth 532 (NHU). Industrial brass tube, fittings; 7000 & 8000 Ermeto steel tube fittings, 2 & 3 piece 37° J1C steel tube fittings bulk hose; Reusable hose ends crimped, clamped and swaged hose assemblies, nylon fittings and teflon hose. In attendance: Geo. Anderson, sales manager O. E. M. Division; Earl Bartley; Joe Holiger; Chas. Craig; Fred Bromilow; Jack Myers; Chas. Sutton. Hotel headquarters: Bismarck.

The S. K. Wellman Company. Booth 334 (NHU). Will feature new Velvetouch Ceramic button-type clutch plate for industrial crawler tractors, and new clutch plate material for on-and-off-the-highway trucks. W. E. Canfield, v. p.; Geo. E. Romine, sales manager; R. C. Brigleb, sales manager. Morrison Hotel.

The Wellman Engineering Company, William Bucket Division. 229 (SHU).

Westinghouse Transit Mixer Division, LeTourneau-Westinghouse Company. Booth 851 (DH).

White Manufacturing Company. Booth 605 (SHD). New Model L-10 asphalt plant complete, a new bituminous patching plant, and a complete line of asphalt heating kettles. A complete line of concrete trowelers or finishing machines with accessories. Complete line of concrete vibrators, and two new models of concrete vibrators which have not before been announced. In attendance: W. McK. White; W. McKean White, Jr.; M. A. King. Hotel headquarters: Conrad Hilton.

The White Motor Co. Booth 811 (DH). New White 9000 and new White 3000 trucks, also new two new Autocar trucks. Cut-away of engines and a White "power package" industrial engine also will be shown. White's diesel engine division will exhibit representative engines from its Superior and Atlas line.

Williams Mobile Offices, Inc. Booth 809 (DH).

Wisconsin Motor Corporation. Booth 304 (NHU). Engine line of Wisconsin engines, featuring new Models VH4 and VR4D. In attendance: Harold A. Todd, Phil Norton, Ray J. Fellows. J. W. Perschbacher, Tom Barrett, George Duncan, John Julien, Fred Mueller, Joe King, Jim Walz, Homer J. Bliss. Hotel headquarters: Conrad Hilton.

Gar Wood Industries, Inc. Booth 700 (EH).

Wooldridge. Booth 420 (NHD). Feature presentation of the Woolridge complete scraper line will be an advanced model of the "Cobrette" self-propelled scraper in the 7.5 to 10-yd. class. It is stated this scraper will incorporate at least two major elements never before offered in this class of equipment, in addition to a number of refinement in overall design.

Worthington Corporation. Booth 733 (EH). Complete line Blue Brute compressors and contractors' tools, new portahoe self propelled wagon drill, full sized working model of 125-ft. rotary compressor and a 5½-cu. yd. Hi-Up truck mixer.

By-mail course in construction welding

Welding, just as much as other crafts vital to roadbuilding and construction, requires trained supervisors, inspectors and designers, as well as welding craftsmen.

Contractors who expect to bid on bridges and overpasses and other structural work involving welding, as well as highway department designers and construction supervisory people, will be interested in a correspondence course recently offered in this field.

The course entitled, "Welding Fundamental Principles and Practices" is announced National Technical Training Services, 260 Delaware Avenue, Buffalo, N. Y. The course was originally developed by Canadian Welding Bureau, a service organization sponsored by the metals industry and welding equipment manufacturers. The course was prepared by a technical staff recruited from industry and no important source of reliable data has been overlooked. Material from the publications of the American Welding Society are extensively incorporated and A.W.S. codes and standards are referred to wherever applicable.

The course includes Welding Methods, Procedure Control, Distortion Control, Weldability, Welding Metallurgy, Design, Inspection, Materials and Equipment, Estimating and Costs and Economies and is illustrated throughout with half-tones and line drawings wherever these can assist the student. The 16 lessons take about 10 months to complete. Exercises are required to be completed and returned for grading; progress is thereby observed and remedial instruction given.

Readers of ROADS AND STREETS desiring further details should write the company at the above address.

New Equipment Seen At the Road Show

New machines, accessories, tools and materials announced for exhibition at the ARBA Road Show, being held at the International Amphitheater in Chicago, January 28 through February 2. For other new product announcements, see also Reader Coupon on page 16 and "What's New in Equipment and Materials" section in this issue.

Full Circulating Turn-Up Spray Bar Unit

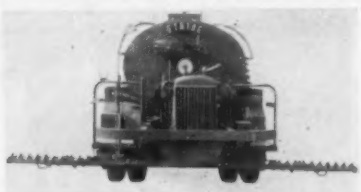
An entirely new full circulating turn-up bituminous spray bar stated to be the latest advance in spray bar design will be shown at the Road Show by E. D. Etnyre & Co., Oregon, Ill.

This new lighter weight, air-operated spray bar is claimed to combine important features never before found in one spray bar. Full circulating for uniform application, the bar inverts 90° from spraying position—positively assuring complete drainage and eliminating any chance of drip from nozzle valves.

An individual valve for each nozzle permits independent nozzle operation over entire length of bar. Hollow plug-type valves give instant start or cut-off of spray—fit snugly to bar for better heating, yet offer no obstruction to full circulation.

End sections relieve on built-in leak-proof ball-bearing hinges for full 90° to prevent damage if bar hits obstruction.

When not spraying, material can be circulated full length of bar with extensions in either spraying or folded position. Bar shifts to follow edges of road, adjusts for proper height of spray. Ends fold, raise, and lock for traveling.



Bar Is Shown Here in "Up" Position —Providing Full Drainage for Valves and Bar

For more information circle 170 on Service Coupon Page 16 and mail now.

Bituminous Distributor

A new South Bend bituminous distributor will be shown in Booth 313 Ave. C, by Municipal Supply Co., 2508 S. Main St., South Bend 23, Ind. Outstanding feature of the distributor is a powerful rotary, self-draining pump. Especially designed, it sucks back all bituminous material from the spray bars to the supply tank when a job is completed. It helps to eliminate lost time due to clogged lines.

A 10 to 1 gear reduction supplies plenty of power to the pump permitting

Trailer Mounted South Bend Bituminous Distributor

easy distribution of heavy bituminous materials. Other features include a full-circulating type spray bar with individually operated valves at each spray nozzle, aluminum alloy spray bar extensions, and joints that allow the spay bar to swing away from road obstacles.

Proper chassis load distribution, is stated to have been solved in the new distributor.

A new South Bend "Model A" maintenance distributor will also be on display at the Road Show. Although designed primarily for bituminous maintenance work, this unit can easily be equipped for controlled distribution of bituminous material up to a width of 12-ft. with the addition of two tachometers.

For more information circle 171 on Service Coupon Page 16 and mail now.

1-Yard Crane-Excavator

A completely new crane-excavator in the 1 yd. class will be exhibited by Bucyrus-Erie Co., South Milwaukee, Wis., at the Road Show. Named the Model 30-B, it is a readily convertible shovel, dragline, clamshell, crane, or dragshovel. The new model is offered with five sizes of crawler mountings. It is also offered as a carrier-mounted transit crane, rated at 35 tons.

Main operating functions of the machine are air controlled. Air controlled functions include hoist clutch, crowd and retract or drag clutches, swing and propel clutches, steering jaw clutches, digging brakes, swing brake and dipper trip.

The new 30-B crawler machine is available with diesel engine with either direct drive or torque converter drive, gasoline engine with direct drive, or electric motor. The transit crane is offered with gasoline engine with direct drive as standard equipment. A diesel engine with either direct drive or torque converter drive is available as optional equipment.

Simple in design the 30-B has a strong, rigid cast steel revolving frame. Six large conical hook rollers—two equalized pairs in front, two singles in rear—evenly distribute loads between upper and lower works, ride on a flame hardened cone roller path.

As a crane, the 30-B crawler handles booms up to 100 ft. long plus 10, 20 or 30-ft. jibs. The transit crane handles booms up to 130 ft. long or a 110-ft. boom with a 30-ft. jib. Booms furnished with the crane are of open throat construction.

For more information circle 172 on Service Coupon Page 16 and mail now.

40-Ton Rear Dump

A new 40-ton rear dump Euclid with a struck capacity of 26 cu. yd. will be dis-

Model 30-B Crane-Excavator

Model R-40 Euclid 40-Ton Rear Dump

played for the first time at the Road Show by Euclid Division, General Motors Corporation, Cleveland 19, Ohio.

A twin-power unit with separate engines, each driving its own rear axle through 3-speed Allison torqmatic drives, the new unit replaces Euclid's former 34-ton model.

Known as the R-40, it is powered by either two 235 hp G.M. engines or two 250 hp Cummins engines. Both are turbo-charged providing a substantial increase in horsepower. Tires have been increased in size to 18.00 x 25 and a larger differential employed.

For more information circle 173 on Service Coupon Page 16 and mail now.

Four-Wheel-Drive Truck

A new four-wheel drive truck will be shown for the first time at the Show by the Duplex Division of the Warner & Swasey Co., Cleveland, Ohio. The truck features a snow blade, a scraper blade and a dump body. It has been developed to meet the need of state, county and municipal departments for snow removal and highway maintenance.

New Duplex Four Wheel Drive Truck

For more information circle 174 on Service Coupon Page 16 and mail now.

Stabilized Base Mixer

In the new Cedarapids stabilized base mixer, Iowa Manufacturing Co., Cedar Rapids, Ia., has utilized the same design and construction principles of its successful bituminous pugmill mixer for producting accurately controlled stabilized base material.

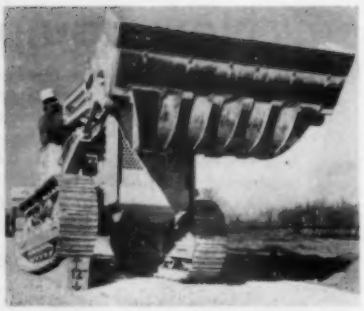
The new unit, which will be shown for the first time in Booth 723, consists of a Cedarapids volumetric proportioning continuous-mix type pugmill, aggregate hopper and can be equipped with a delivery conveyor, and water meter and water pump as optional equipment. All components are mounted on a pneumatic-tired chassis for portability.

Use of the Cedarapids stabilized base mixer is stated to permit accurate moisture density control obtainable by surface mix methods, and to eliminate the necessity of using other equipment for sprinkling or spraying. The new unit is available with either a 38 in. pugmill (rated capacity 500 T.P.H.) or a 24 in. pugmill (rated capacity 200 T.P.H.), to meet varying production needs.

For more information circle 175 on Service Coupon Page 16 and mail now.

Crawler Loader

Two new TerraTrac crawler-loaders, in the 1½ to 2 cu. yd. range, will be shown for the first time at the Road Show by American Tractor Corporation, Churubusco, (Ft. Wayne) Ind. Machines are said to incorporate a number of engineering advances, including a new power-shifting terramatic transmission, which provides completely independent power control of each track, both as to speed and direction. Thus, in addition to smooth, non-stop shifting from forward to reverse and from one travel speed to another, the TerraTrac operator has three choices of power steering, including counter-rotating spin turns. New torsion bar track suspension, designed to insure complete equalization and cushioning of loads, enables the new TerraTrac loaders to maintain a level cut with full traction on both tracks, regardless of irregularities in the ground surface. As shown in the illustration, the front end of one crawler track can be raised 12 in. above ground and still keep the bucket cutting edge level and the other track flat on the ground. Both loaders have a dumping clearance of over 9 ft. with bucket fully dumped, plus exclusive "knock-out" action for discharging sticky materials at all heights—from 31 in. up to maximum dumping height.



New TerraTrac Crawler Loader

For more information circle 176 on Service Coupon Page 16 and mail now.

Roller with "Reverse-O-Matic" Drive

The feature of the exhibit of Acme Iron Works, San Antonio, Tex., in Booth 610 will be the new "Reverse-O-Matic" drive Ingram roller.

On display will be a 12-ton Ingram roller equipped with the new "Reverse-O-Matic" drive which is stated to permit no-stop power-shifted reversing with just one lever controlling both the speed and the direction of the roller. With "Reverse-O-Matic". the roller can be shifted into reverse while moving forward, with no delay for stopping, clutching, or shifting gears.

The "Reverse-O-Matic" is a completely sealed-in-oil unit which requires no maintenance and no adjustments, and there are no clutches to replace. It is stated to furnish smooth, shockless power which reduces engine wear and prolongs the life of the other power transferring mechanisms.

Ingram 12-Ton Roller

For more information circle 177 on Service Coupon Page 16 and mail now.

Batching System

A new batching plant will be demonstrated in Booth 801 by Butler Bin Co., Waukesha, Wis. The complete unit, called the Butler BB-4 Automatic Batching System, consists of four new Butler bins, for stone, sand and cement, each with four automatic batchers. It is stated to easily keep pace with four 34E dual drum pavers, yet the whole operation is controlled by one man. Four batches of each material are produced simultaneously.

(Continued on page 114)

Cedarapids Stabilized Base Mixer

The New UNIT Model 510 *Challenger* ... as a Trenchoe

DESIGNED with a BACKGROUND of 3/8 YARD EXPERIENCE

Evidence of highest quality engineering and construction includes alloy steels and forgings • anti-friction bearings • modern transmission design with involute splines to add strength and reduce wear • straight-in-line engine mounting with torque converter • trunnion supported tapered drums to eliminate bending stress on drive shafts • easily accessible hydraulic clutches • minimum number of main machinery gears enclosed in one-piece cast gear case • force feed lubrication • self-aligning replaceable hook shoes distribute applied pressure over maximum area • interchangeability of parts simplifies maintenance, cuts costs. All these UNIT advantages mean more profitable operations for you.

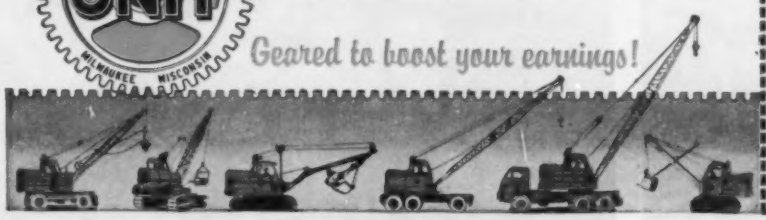
Why it's BEST *to* INVEST *in modern* UNIT *models*

Because each feature has been proven to contribute substantially to the Life, Performance and Efficiency which have made present and previous UNIT products readily acceptable.

Send for Bulletin Now... Use Coupon!

UNIT CRANE & SHOVEL CORP.
6407 W. Burnham St. • Milwaukee 14, Wis., U.S.A.

Geared to boost your earnings!



UNIT CRANE & SHOVEL CORP.
Milwaukee 14, Wisconsin

Please send me your new Bulletin on the UNIT CHALLENGER Model 510.

Name.....

Address.....

City.....

State.....

A 8236-1PCR

. . . for more details circle 230, page 16

How concrete-smashing PRY-ACTION BREAK gets you jobs other

Contractor Leon Sumler, Jackson, Tennessee, applies exclusive triple-power pry-action break-out with his TD-9 Four-In-One Skid-Shovel. And without delay, he breaks-up, and yanks-up an old filling station's concrete slab and footings!

This new 3-yd. TD-18 Four-In-One Skid-Shovel proved able to do as much as 3 power shovels and a dragline—excavating and loading up to 1,700 lineal feet of old concrete pavement daily—operating for Henry E. Berghuis, Prinsberg, Minn.

Street-widening and regrading calls for removing old concrete pavement—which the new TD-9 Skid-Shovel is loading out at 600 cu yds per day! Dennis Widmer, Portland, Oregon, owns this outfit with the job-getting break-out power!

-OUT... rigs can't do!

Pry-action break-out force ranges from 12,000 lbs. on the International Drott TD-6 Four-In-One Skid-Shovel—to 27,000 lbs. on the TD-18 model. For special applications like land-clearing, the TD-18 model can be equipped with larger hydraulic cylinders to develop 54,000 lbs. of break-out!

Patented and exclusive International Drott pry-over-shoe break-out action gives you *up to six times as much excavating power* as ordinary front-end loaders can deliver! Only an International Drott gives you this multiplied force of the scientific lever principle acting over big skid-shoes, and teamed with ground-level bucket roll-back. *No other loader even has skid-shoes!*

Only International Drott-developed reverse cylinder action produces the tremendous hydraulic power for pry-action break-out. And this pry-action principle shunts shock-stresses directly into the ground—so they can't maul loader or tractor.

Measure the job-getting, capacity-adding advantages of exclusive triple-power, pry-action break-out. Note how exclusive parallelogram raise action keeps the bucket level, all the way up—reduces spillage—increases your daily yardage up to 18%! Prove that exclusive, shock-swallowing Hydro-Spring protects equipment, adds operator comfort. And try the exclusive International Drott Four-In-One that *gives you four-machine utility* for one moderate investment—in your choice of four sizes, one-yard to three-yard capacity. See your International Drott Construction Equipment Distributor for a demonstration.

Thirty-six times as fast as 3 men and a jack-hammer could do it—this TD-14 *broke-up, dug-out, and loaded* 180 lineal feet of old one-by-four-foot concrete wall, in only 4 hours! Owner: Anderson Trucking and Excavating, Inc. Buffalo, N. Y.

A tough oak tree with 22-inch trunk is uprooted with the tremendous pry-action break-out—applied by TD-14 using grubber blade attachment, instead of bucket. Owner Lester H. Davis, Bennington, Vermont, is clearing farm land.

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

INTERNATIONAL® DROTT®

. . . for more details circle 239, page 16

When Worn Rollers and Sprockets Need

HEAVY welding and particularly building up and salvaging worn parts by hardfacing, has become a big-volume item in the repair and overhauling of construction machinery. Many contractors and also not a few equipment distributors these days are turning such work over to specialist shops.

Such a shop serving the New York metropolitan area is Spino Roller Welding Service, of 55-10 48th St., Maspeth, L. I. Joseph and Henry Spino, the owners, play an important role in helping to keep equipment running on hundreds of construction and roadbuilding jobs in the region.

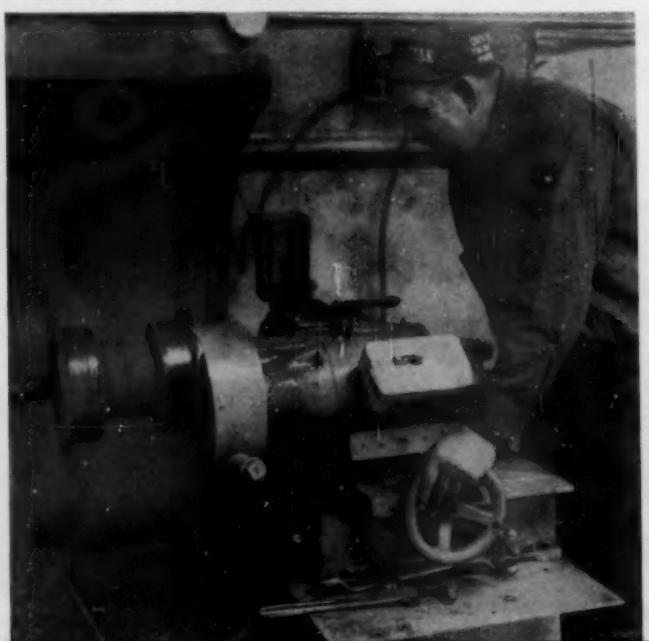
Here pictured is some of Spino's equipment and shopmen in action, and a few examples of their handiwork as produced with Stoody 105 hardfacing rod. The company uses an Amsco semi-automatic submerged arc welding equipment.

Going through the shop this particular winter day, were the usual consignment of tractor rollers, shovel and crane rollers, undercarriage rollers, house-moving rollers, sprockets, front idlers for dozers and shovels, bucket and dipper teeth, shovel, dragline and clamshell buckets, etc.

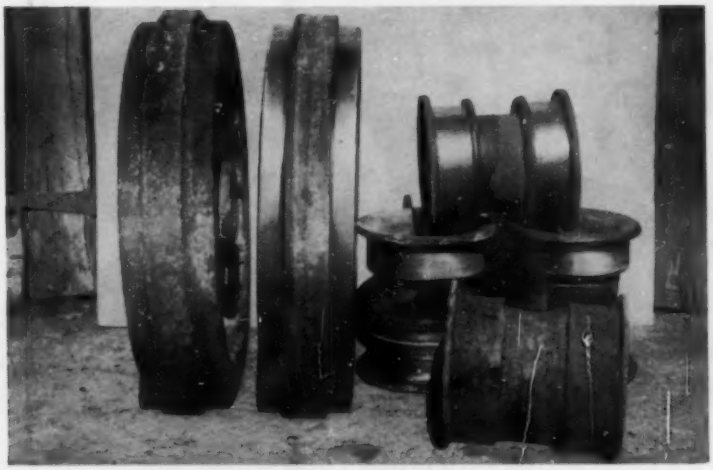
● Showing a skillfully laid built-up of hardfacing metal on a worn roller.

● Another consignment of tractor rollers, built-up and ground to "like new" condition.

● One of Spino's grinding operations.



Hardfacing, They Send 'Em to Spino

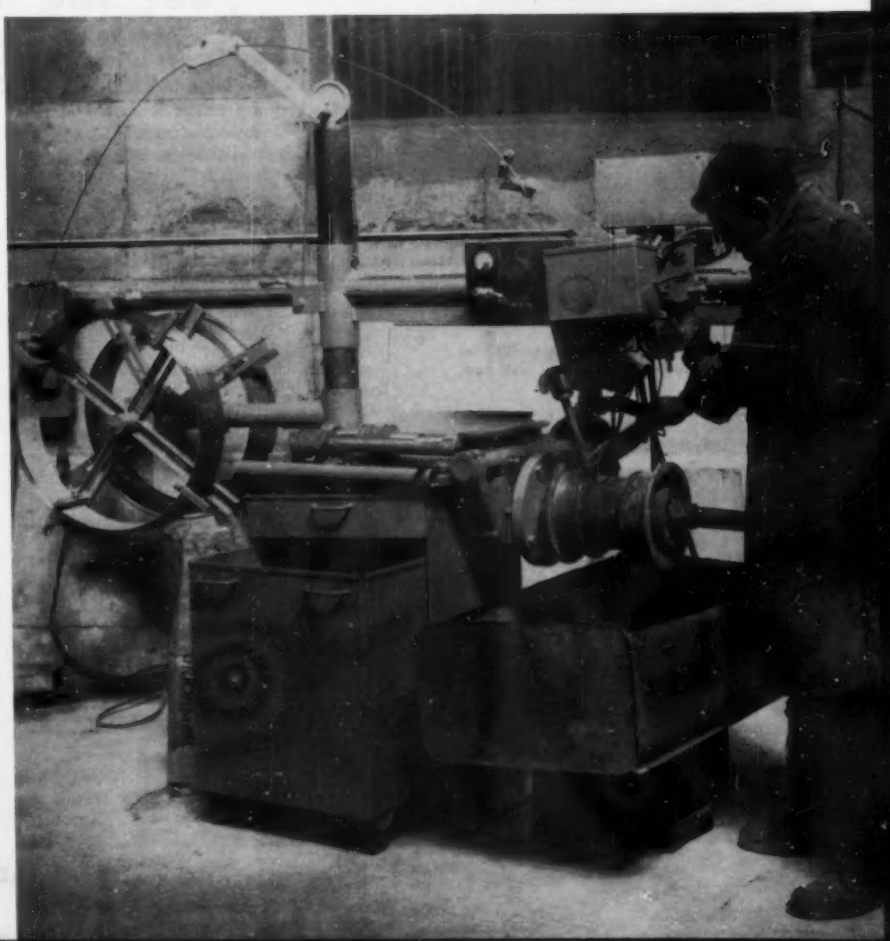


● Before and after—good job of grinding on sprocket and rollers.

● A batch of dipper teeth being built-up for more yardage production.

Spino's shop, centrally located at 55-10 48th St., Maspeth, L. I., serves such contractors as Slattery Contracting Co., Gull Construction Co., and Tully and DiNapoli, to name a few. Among their distributor customers are such firms as H. O. Penn Machinery Co. and France Tractor Co.

● Equipment like this in Spino's specialty shop can often do a more uniform job of hardfacing and welding than the contractor's welders, and at lower cost. Submerged arc welding machine made by American Manganese Steel Co. Stoody 105 and Morweld rod being used.



$8.2 billion for roads spent in record year

Representing the 11th successive year in which highway construction and other highway work has advanced since the war, the year 1956 chalked up a record of $8.2 billion invested in the nation's highways. According to figures by the Bureau of Public Roads, this total—$800 million above 1955—includes $5.5 billion for construction, $1.9 billion for maintenance and the remainder for administration and other fixed costs.

Movie on snow plowing

Civic clubs and other community organizations in Maine have available for their meetings a motion picture sound and color entitled "The Maine Snow Fighters". Prepared by the Maine state highway commission as part of its public relations program, this film is 16 mm in size and runs for 14 minutes. It was prepared by Guy Nicholas of the department and narrated by a professional commentator.

Equipment Seen At Road Show

(Continued)

Butler BB-4 Automatic Batching System

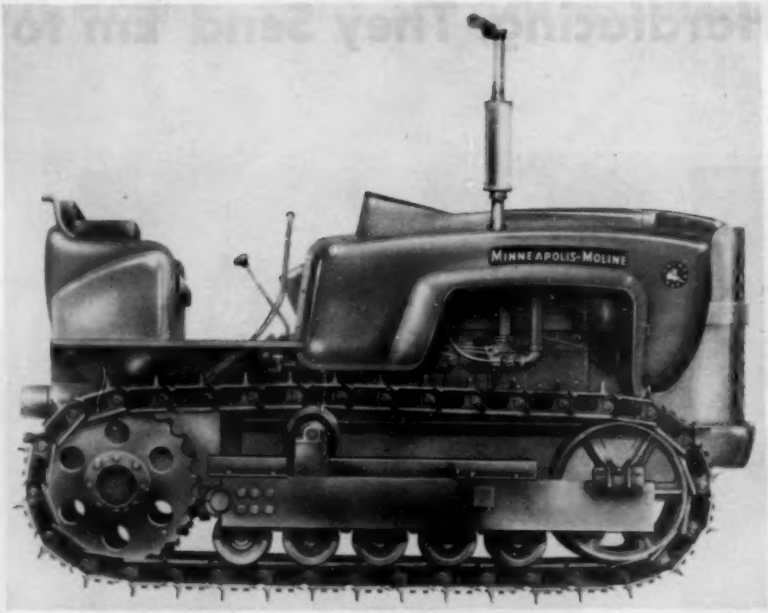
Completely automatic in operation, the batchers are preset for any specification. Push-botton controls are mounted on aggregate bin columns so that discharge is handled by the truck driver from his cab as he passes under the bins. All push button controls for all plants can be operated by the single operator located on the cement bin platform. The system is so completely interlocked batchers cannot be discharged until proper weights are reached, and no batchers can be filled until all materials are completely discharged.

For more information circle 178 on Service Coupon Page 16 and mail now.

57-Hp Crawler Tractor

A new crawler tractor will be shown for the first time in Booth 226 by Minneapolis-Moline Co., Box 1050, Minneapolis 1, Minn. This new MM crawler tractor, first of a series to be completely designed and built in the firm's own plants, is powered by a 57 brake-horsepower engine.

Major engineering features include: new 206 cu. in. engine, new mono-weld main frame with rubber mounting points for the engine to relieve twisting and weaving stresses on engine and transmission housings, shuttle gear with 6 speeds forward and 6 reverse, hydraulically operated without de-clutching; a torque converter is also available as optional equipment. New combination clutch and brake steering units operated by the same lever, extra rugged track frames with 4 or 5 track units and side plates for quick engine servicing.



New MM Crawler Tractor

For more information circle 179 on Service Coupon Page 16 and mail now.

Cable Dump Trailer

A new tandem axle 20 ft. Fruehauf-Schonrock dump trailer is shown in the exhibit of Fruehauf Trailer Co. This unit also is available in lengths up to 35 ft. This dump trailer is actuated by cable instead of the usual hydraulic hoist mechanism. As a result the number of moving parts has been reduced and considerable weight is saved, thus contributing to payload and profit.

One of the reasons for the ability to extend the body length is the able actuation. It is now possible to extend the body and thus obtain maximum length from cab to rear axles, all of which provides greater payload. This allows full latitude under bridge formula laws and permits every additional foot of trailer length to be devoted to greater payload capacity.

Fruehauf-Schonrock Cable Dump Trailer

Dumping, with the tractor jackknifed up to 90 degrees, is possible, and the hanger mechanism keeps all wheels on the ground throughout the dumping period.

For more information circle 180 on Service Coupon Page 16 and mail now.

Off-Road Transport

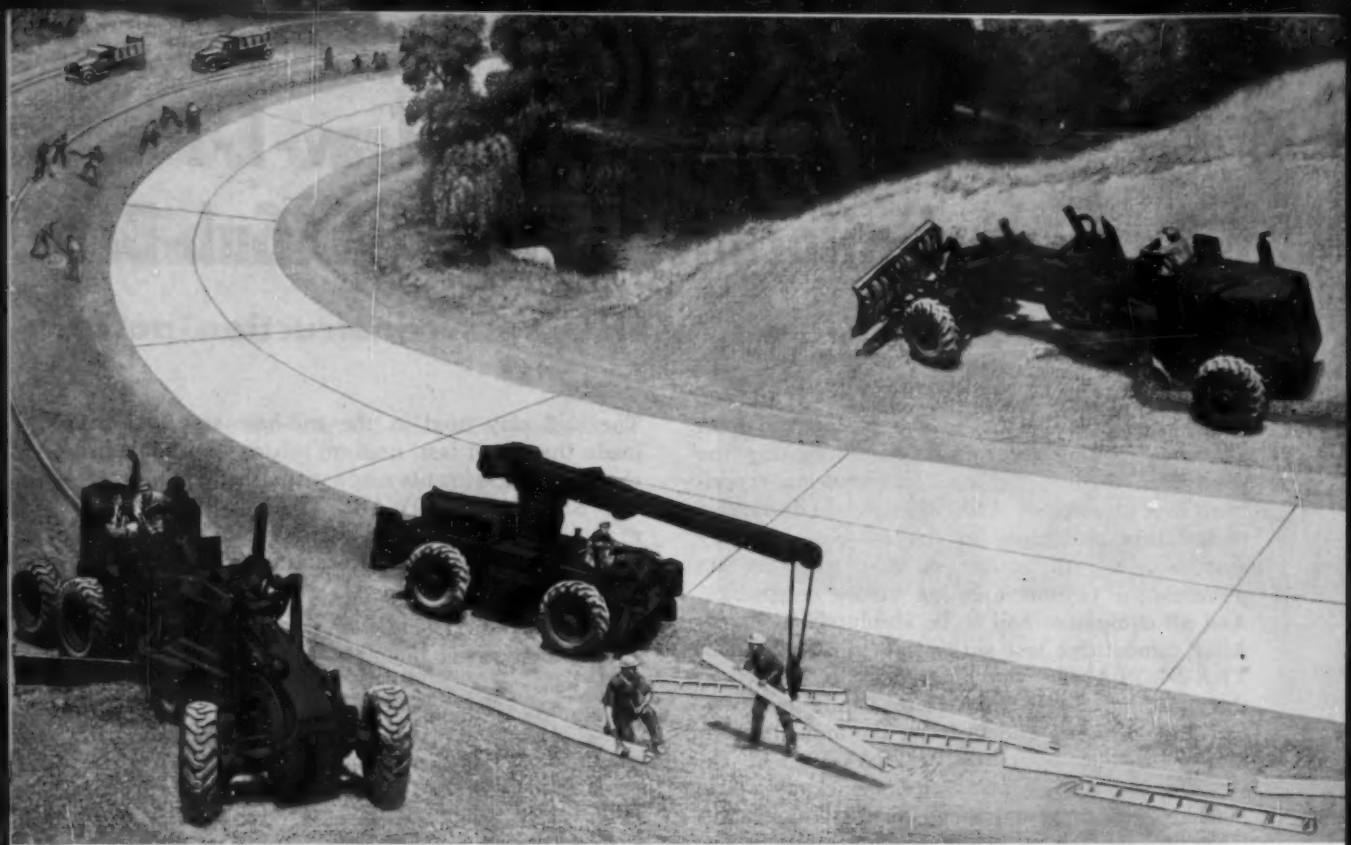
A new type of vehicle for transporting freight over rough open country, without benefit of highways or railroads, will be displayed for the first time at the Road Show by R. G. LeTourneau, Inc., 2399 South MacArthur, Longview, Texas.

Probably the most important single factor contributing to the success of the super-heavy haulers is the fact that a DC electric motor is geared directly to each wheel—making each individual wheel an independent drive unit. Should one wheel lose traction, its share of the machine's total horsepower is automatically transferred to other wheels which are taking hold.

Also utilized is a unique braking system which actually has no parts to wear out or replace. This is made possible by a regenerative—or "feeding back"—action of the electric motors in the wheels. When machine travel-speed becomes greater than the driving speed of the motor, they begin acting as generators and, in effect, create power to stop themselves. Mechanical brakes, however, also are furnished on the machine for use in making emergency stops, or when the vehicle is parked.

Another factor which contributes to the machines' successful rough-terrain operation is the use of large low-pressure tubeless tires which measure more than

(Continued on page 128)



Super 99 Power Grader—
6-wheel drive, 6-wheel steer

Hydraulic Crane with
live boom action

99-L Power Grader—
4-wheel drive, 4-wheel steer

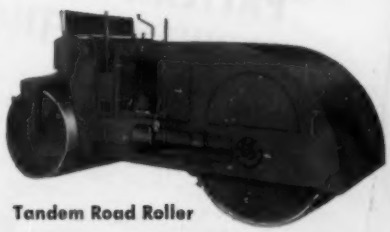
Here's why it will pay you to go AUSTIN-WESTERN in '57

The men who own and operate Austin-Western equipment will tell you that it's tops in its field. Graders, rollers, sweepers and hydraulic cranes all offer you more extra features than anything else in their class. That's why the A-W red is such a familiar sight on construction, maintenance and materials-handling jobs all over the world. Compare these advantages with those of any similar equipment, and you will see why it will pay you to go Austin-Western in 1957:

- **Power Graders**—Built to give 30% more power *at the blade* than ordinary graders. All-wheel drive, all-wheel steer . . . controlled traction . . . precision side-shift . . . high-lift blade (90° right or left) . . . extreme blade reach . . . completely reversible blade . . . finger-tip hydraulic controls.
- **Road Rollers**—3-wheeled, tandem and portable tandem models . . . variable weight, gas or diesel engines. Torque converter drive is smooth, powerful and flexible.
- **Street Sweepers**—Single or double gutter broom models, in 4-yard and 2-yard sizes . . . front steer for safety and maneuverability . . . rear dump for convenience.
- **Hydraulic Cranes**—The most versatile "arms" in industry, combining pickup, carrying and placement capabilities with the best features of crawler, truck and shop cranes. All movements of the live boom are actuated by fast, smooth hydraulic power. Two or more movements of the boom and cable are possible while the tractor is moving, and the angle can be quickly changed while operating under load. Available with a wide assortment of labor-saving attachments.

Find out more about the complete A-W line that's "Built to Outperform"—see your nearby distributor or write us for complete information.

3-wheel Road Roller



Tandem Road Roller

Street Sweeper

Power Graders • Motor Sweepers • Road Rollers • Hydraulic Cranes

. . . for more details circle 276, page 16

AUSTIN-WESTERN WORKS
BALDWIN-LIMA-HAMILTON
Construction Equipment Division
OTHER DIVISIONS: Eddystone • Lima • Electronics & Instrumentation • Hamilton • Loewy-Hydropress • Standard Steel Works • Madsen • Pelton
AURORA, ILLINOIS, U.S.A.

27 Seaman-Andwall Trav-L-Plants Uniformity in AASHO Sub-Base

Global interest shown as AASHO sets construction pattern

Highway officials, engineers and contractors from all parts of the world have been watching the most rigidly controlled road construction experiment ever attempted. AASHO engineers demanded undeviating uniformity in the sub-base of every test section. All equipment had to prove its performance beyond question before acceptance. And all equipment had to be absolutely identical. After competitive test with other mixers, Seaman TRAV-L-PLANTS were selected to do the mixing, the blending of soil particles to attain the specified 95% densities and to bring the moisture content of the fill to optimum. 27 TRAV-L-PLANTS, all equipped with pumping equipment, volumetric meters, spray bars, underbody scarifiers and power steering kept the moisture increment within the tight 2% tolerance demanded.

The stiff clay used in the sub-base stabilization made the job of fast, uniform mixing impossible in the initial experiments made with other equipment. The SEAMAN-ANDWALL TRAV-L-PLANT, on the other hand, demonstrated great superiority in the attainment of the exacting uniformity.

Each TRAV-L-PLANT towed its own water supply because tank trucks were not allowed on grade. 1000 gallon wheel mounted tanks were attached

AASHO TESTS PATTERN FUTURE HIGHWAY METHODS

Sub-grade stabilization, once the most neglected phase of modern highway construction, has come of age. The most recent proof of this comes from LaSalle, Illinois, center of the most ambitious experimental highway construction programs in the nation's history. The American Association of State Highway Officials; all 48 states; the territories of Hawaii, Puerto Rico and the District of Columbia and the Highway Research Board are participating in the construction of this significant test facility. The AASHO test road will be in the nations road building spotlight for many years to come. The painstaking control exercised by AASHO engineers; the precision and perfection of new road building methods and the high speed equipment that was used, will certainly be studied and specified on many thousands of miles of new construction. The techniques and operations adopted at the AASHO test road may well become standard operating procedure on all roads of the future.

SEE THE ROAD SHOW

BE SURE TO SEE THE SEAMAN-ANDWALL EXHIBIT
AT THE ROAD SHOW, SECTION A, BOOTHS 320 AND 323

Achieve Unparalleled Stabilization Tests

for nation's highway program

at the side of the TRAV-L-PLANTS by an outrigger device.

SEAMAN-ANDWALL TRAV-L-PLANTS through their superiority established in the gigantic AASHO experiment have again won recognition and approval as standard equipment in base and sub-base stabilization in the National Highway Program.

Successful bidders for the sub-grade work were the S. J. Groves and Sons, Co. of Minneapolis and the Arcole Midwest Construction Co. of Skokie, Illinois.

A caravan of four TRAV-L-PLANTS on the straightaway of the AASHO test road. It is high production like this that completes the sub-base stabilization work on time. A total of 27 such units were on the job.

The Seaman-Andwall TRAV-L-PLANT with special outrigger water supply tank on a super-elevated "turn-around" of the AASHO test road. Note the outrigger wheel and novel hitch arrangement. No standard water trucks were permitted on the grade.

Under-body scarifier of the TRAV-L-PLANT makes secondary scarification an easy task in the cloddy clay soils of central Illinois. The scarifier is standard equipment on this machine.

Here is a new complete-line Bulletin describing all of the Seaman-Andwall products. You'll see them at the Road Show — but send NOW for this valuable literature for your files. Mail a postcard today . . . ask for Bulletin CL-57.

Stabilizing the World

SEAMAN-ANDWALL CORPORATION

A Division of American-Marietta Company

Dept. R-229

MILWAUKEE 1, WISCONSIN

. . . for more details circle 241, page 16

All over Texas the TD-14's get jobs, and *produce!*

Over 225 International have whipped tough for Brown

BUILDING FIRE WALLS IN LIBERTY. One of ten TD-14 tractors, recently purchased by Brown and Root, builds roads, flood dikes, and clears land for new well sites. New TD-14 provides genuine "in-seat" starting!

SPREADING AND COMPACTING IN HOUSTON. TD-14 with both ends busy, spreads fill and compacts it at the same time with a sheepsfoot roller. Construction is for preparation of new Juvenile Detention Home site for Harris County.

SPREADING FILL IN HOUSTON. This TD-14 levels land on 360-acre naturalistic park, on south shore of Lake Houston. The new bonus-powered TD-14 has new bridge-strong box-beam track frames—for big-capacity, tough-material dozing!

BACKFILLING TRENCH IN TEXAS CITY. A 74-mile long, 8-inch pipeline from Hull to Texas City undergoes its last operation with another TD-14. Cerametallic engine clutch facings reduce operator effort and prolong clutch life in fast "shuttle-dozing" like this!

REPLACING PIPELINE IN HOUSTON. Stationed near home, this TD-14 joins a trench-hoe to move muck for pipeline replacement in railroad yard, at Sheffield Steel Company. In muck, mud, or water, new track roller seals save inspections...exclude grit, retain lubricant.

CORPORATION

. . . for more details circle 241, page 16

TD-14's jobs everywhere and Root, Inc.*

*and associate Companies

BROWN AND ROOT RADIO-DISPATCHED TRUCK with International TD-14 gets "go-ahead" from dispatcher. Because of modern methods, Brown and Root TD-14's can be on the job anywhere in East Texas in just a few hours. No special haulage permit needed to transport the easy-to-truck TD-14!

International TD-14's give big contractor "middleweight" mobility and heavy work *power-punch*... to profitably finish jobs fast!

Internationally-famous contractor, Brown and Root, Inc., take the tough jobs wherever they are, from Guam to Guatemala—from Alaska to Calcutta. On work requiring 70-80 dbhp, they have purchased more than 225 International TD-14 crawlers to get unmatched job-to-job mobility and big capacity.

Another big reason for this choice, the TD-14 starts seconds-fast in all weather with famous International gasoline-conversion diesel starting. It's on the job fast without profit-gobbling delays!

Another big reason, new built-in operating ease, control tower visibility, hydraulic booster steering, clean geared-for-action deck, adjustable deep-cushioned seat. ALL add job-getting efficiency and cost-cutting capacity!

Other reasons: low operating cost; servicing ease! The heat-defying new Cerametallic engine clutch facings increase life, save adjustments! Famous micrometric fuel pump precision saves fuel, postpones overhauls. New track-roller seals hold greasing to 500-hr. intervals!

Reasons like these are why contractors everyhere are standardizing on bonus-powered International crawlers! Try one on your next job. Your International Construction Equipment Distributor will gladly demonstrate!

BREAKING DOWN RICE LEVEES IN ANAHUAC. Not all of Brown and Root Corporation's TD-14's work on industrial projects. This one tears down rice levees on a special assignment when oil field or other work is slack.

INTERNATIONAL HARVESTER

INTERNATIONAL® Construction Equipment

International Harvester Company, 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Side Boom Tractors . . . Self-Propelled Scrapers and Bottom-Dumps . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Trucks . . . Diesel and Carbureted Engines . . . Motor Trucks

. . . for more details circle 241, page 16

every day is a Road Show Day for ROGERS TRAILERS

√ Check and you'll choose a ROGERS

See them Illustrated and Described in Detail . . .

Today Rogers is doubtless the best known and most respected name in the low bed trailer field. Units are being operated throughout the world by public utilities; state, county and city highway departments; heavy movers, riggers, contractors and military organizations.

Through long, specialized effort Rogers engineers have developed new designs that are now in common use and originated valuable Patented features that are available on Rogers trailers exclusively.

ROGERS BROS. CORP. Albion, Pa

See the Continual SHOW of ROGERS TRAILERS on Heavy HAULING OPERATIONS on the ROADS EVERYWHERE

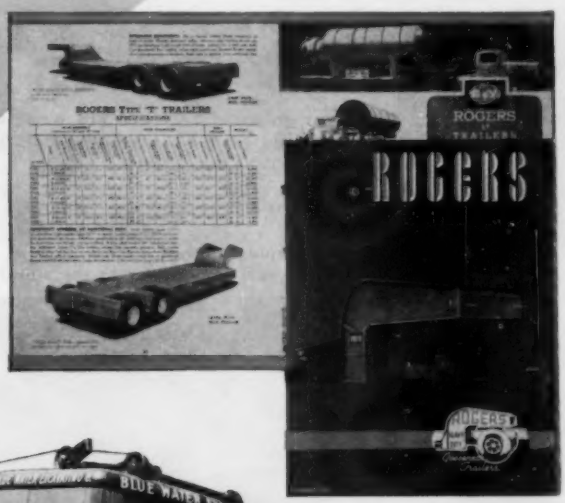
You'll see them on short hauls in cities and towns and on the long, between-city hauls moving at a rapid rate. There's no time lost in loading, unloading or hauling when a Rogers trailer carries the load.

Heavy haulers and experienced riggers everywhere know they can depend on Rogers Trailers for LOADABILITY, HAULABILITY and CONTROLABILITY.

That's why the big majority of them have wisely standardized on the Rogers Line of Heavy Duty Trailers.

Learn Why they're FIRST CHOICE for the HEAVY HAUL

Read the Rogers Catalog



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ROGERS HEAVY DUTY Gooseneck Trailers

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ROGERS BROS. CORP.
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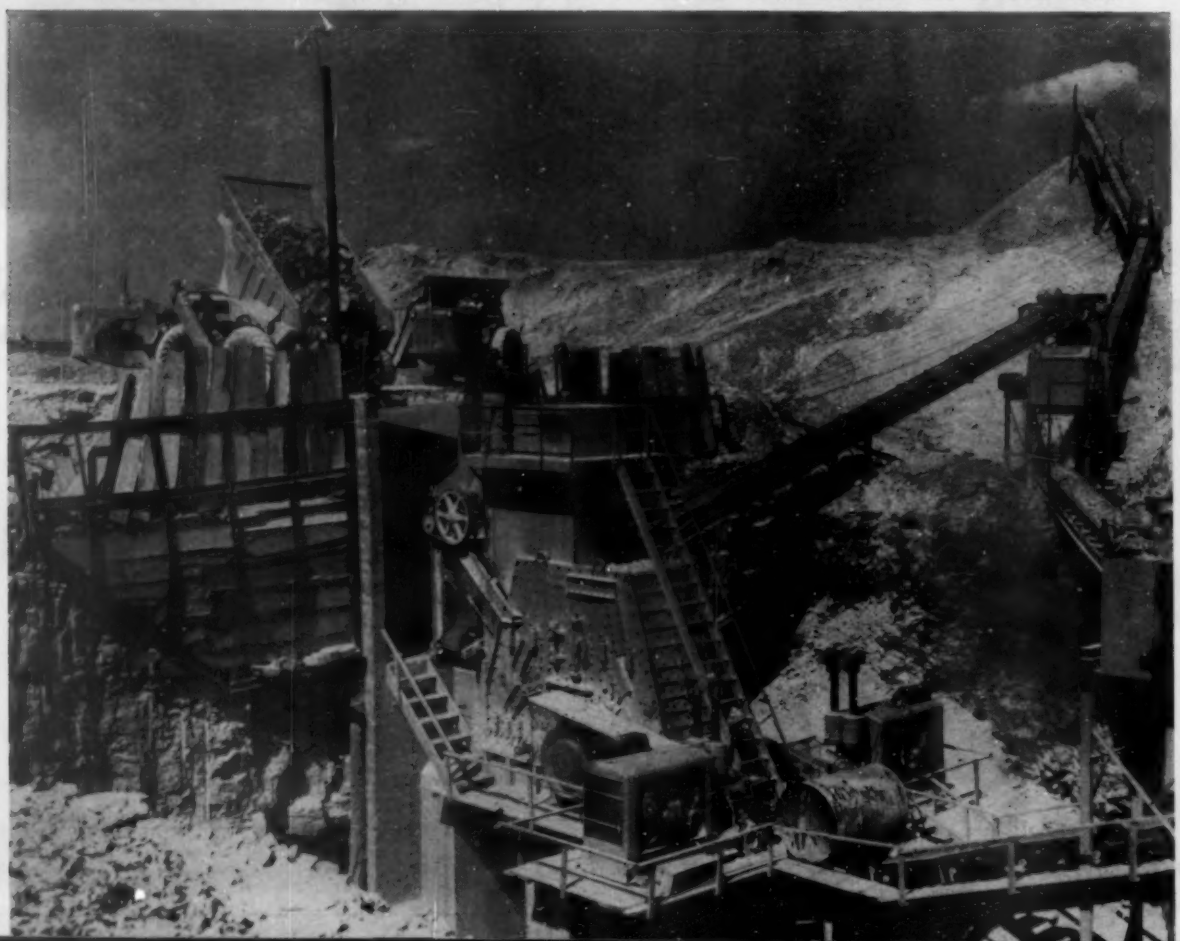
EXPORT OFFICE: 50 CHURCH ST., NEW YORK 7, N. Y., U. S. A.
CABLE ADDRESS BROSITES

● Grease guns were kept within handy reach on this rack alongside the plant.

1,500,000 Tons of Crushed Stone for a Single Paving Season

This producer's answer was a million-dollar stationary type plant, engineered specially for high production of limestone with minimum fines. No. 3 of a Series on Aggregate Production for the Kansas Turnpike.

● Primary crusher—Cedarapids' largest double impeller impact breaker. Fines and dirt passing a grizzly went to the screen shown, which sent waste fines to the pile, returned remainder to primary belt seen in lower right.



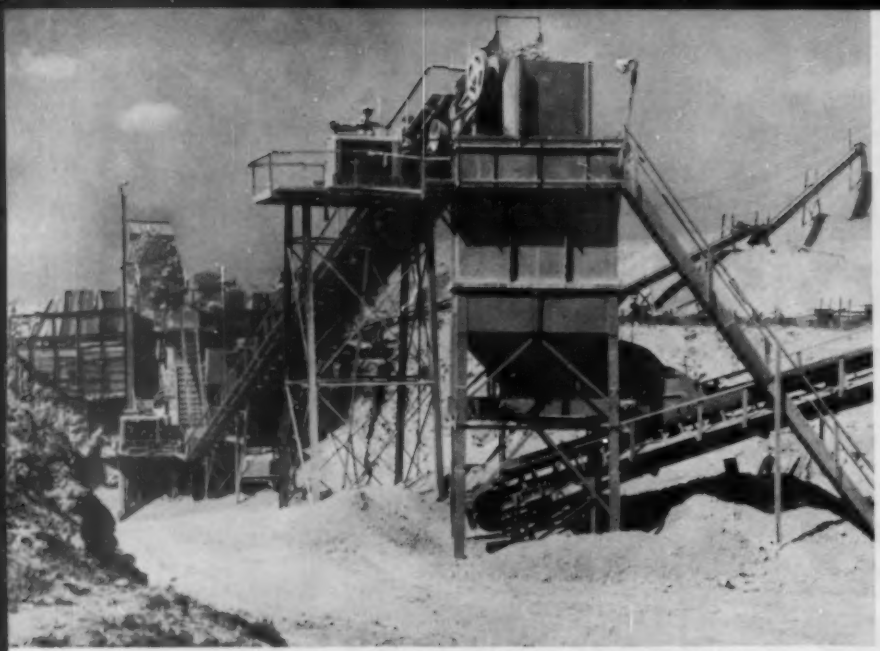
● **Continuation of photo shown on opposite page: panoramic view of the plant. Material flowed by primary belt (in foreground) to surge hopper, then by another belt to a "double-double" tower-assembly of screens and hammermills for secondary crushing.**

Most of the thirty-two aggregate plants along the Kansas Turnpike which have worked through 1956 on a 10,000,000 ton production schedule, have consisted of portable rubber-tired units. An exception is the plant erected near Eskridge, south of Topeka, by Concrete Materials and Construction Co. This firm of aggregate producing specialists from Cedar Rapids took a look at the 1,500,000 ton job and the limestone involved, and came up with an array of equipment mounted on concrete pedestals.

Said to represent a million-dollar investment, the plant has an average capacity of 1,000 tons per hour. It is part of the big-tonnage effort which enabled the paving of the entire 236 mile turnpike in the 1956 season.

The plant, which embodies Cedarapids equipment throughout, supplied subbase, base and shoulder stone for three adjoining paving sections, totaling 25 miles, held by J. B. Michaels, general contractors, and part of an adjacent section held by Kaw Paving Co. The large tonnage was required chiefly for the heavy 18-in. flexible base, specified to be spread full grade width for this asphalt-paved part of the road. While gradation and quality for the upper 8 in. base differed somewhat from that required for the 10 in. subbase and the shoulders, the difference was not great. The producer was given permission to utilize a single grade of 2 in. maximum stone complying with base course aggregate specifications for the entire job. The plant was designed on this basis.

● **Quarry loading was done with three Northwest 80D shovels. How the job looked at season's half-way mark.**



● Another view of the primary belt with double impeller impact breaker in background.

● Allis-Chalmers wagons delivery from quarry to primary feeder.

Hot mix aggregates for this paving was produced by Concrete Materials & Construction Co. at a different location.

The combined mixture of subbase and base course materials was specified to be uniformly graded from coarse to fine and conform to the following extreme limits of gradation at the time of delivery to the roadway, but prior to compaction:

U. S. Std. Sieve	% by Weight Passing (Subbase)	(Base)
2 in.	100	100
1½ in.	100-75	100-70
1 in.	100-60	100-60
⅜ in.	95-45	95-39
No. 4	80-25	75-25
No. 10	65-17	55-17
No. 40	40-8	30-8
No. 200	*12-0	*12-0

The latter column is the one governing the production here described because both base and subbase construction were progressing concurrently.

The percent passing 200 sieve could not exceed three-fourths of that passing the 40. Gradations near the maximum allowable on one sieve or near the minimum on the next sieve (or vice versa) were not permitted. The Plasticity Index was limited to a maximum of 5 and Liquid Limit to maximum 25.

● *80 Acre Site:* The site in flat terrain involved 40 acres purchased and 40 acres leased. Conditions at this quarry were far from ideal. The limestone in many places was found to be seamy, the rock dumped into the primary containing up to 4 percent clay despite most careful overburden removal. Excessive fines were seen to be a problem that could never be entirely eliminated.

Earth overburden running 6 to 10 ft.

(Continued on page 126)

● This Kansas farmer never had it so good—17-ft. limestone "crop" was harvested from most of an 80-acre tract.

DISCOVER DAVIS

THE EQUIPMENT THAT LEADS THE WAY

Davis Truck-Mounted Back-hoe from the transport to the digging position.

The Model 185 cleaning a ditch at right angles to the tractor

The streamlined Davis Loader on John Deere 420 Crawler Tractor

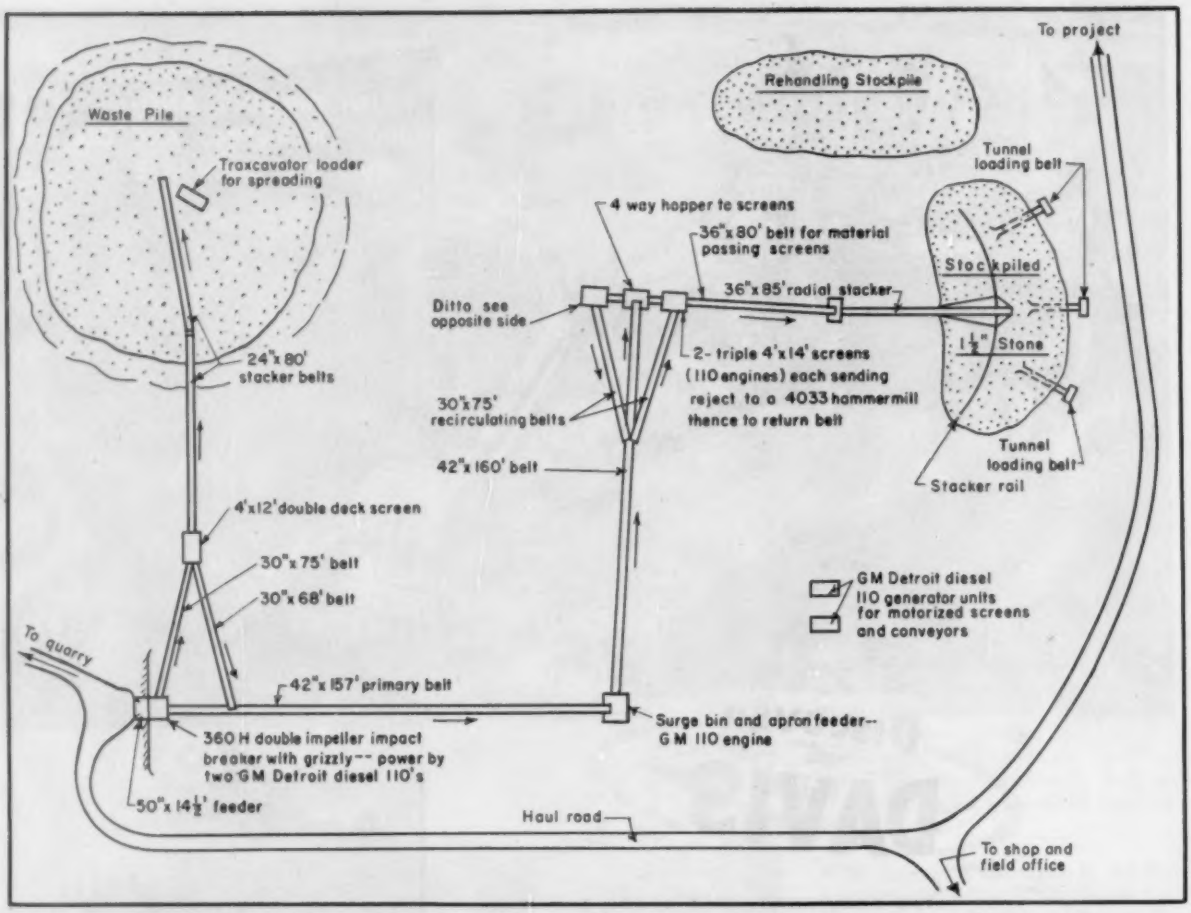
New Back-Hoes and Loaders for 1957 Make More PROFIT FOR YOU!

Here's a whole new era of profits for you. The new Davis 210 Back-hoe with three interchangeable mounting points so you can switch digging positions from center to side for flush digging alongside buildings, fences, etc....and its **exclusive hydraulic rotary boom swing cylinder** gives you a smooth, continuous 200° cushioned operating arc without ever changing a pin...an engineering achievement desired by all, but accomplished only by Davis. Both the new 210 and America's largest selling back-hoe, the Davis 185, have **7,000 pounds of breakaway** and new comfort design. They are both available as Davis' unique, low-cost, **truck-mounted back-hoes** that will fit any one-ton or larger flat-bed truck...compact in transport, self-powered, completely detachable. The popular **Davis Loader** has also been improved for greater utility...which means more profits for you in 1957, if you have Davis equipment.

Davis products are available for most popular tractors, and are sold and serviced anywhere in the United States and Canada by better dealers. See your dealer or write for literature. Please specify tractor and equipment you desire.

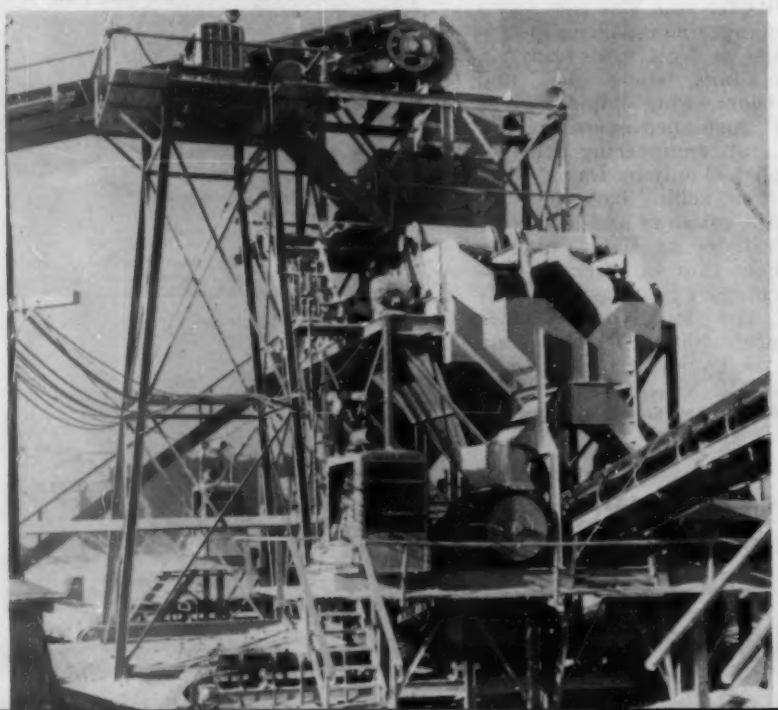
MID-WESTERN INDUSTRIES, INC.
1009 SOUTH WEST STREET, DEPT. R
WICHITA, KANSAS

. . . for more details circle 199, page 16



● **Layout and components of the plant, showing how an elaborate set of belt and screening equipment was required to eliminate excess fines and dirt.**

● **Close-up of the hammermills and related screens. Symmetrical pair of double units were designed for high production even with one of the components down for repairs.**



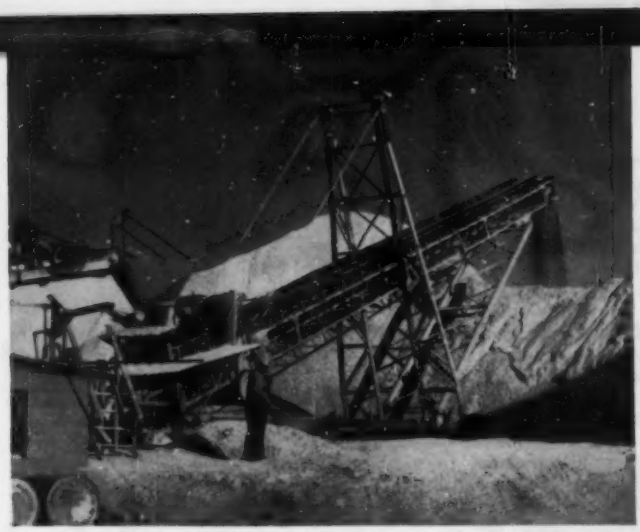
1,500,000 Tons of Crushed Stone

(Continued from page 124)

deep was removed at a 2,000 to 3,000 cu. yd. daily rate using two scraper pans and three dozers. During the early stages, in order not to blanket over good stone areas, the stripping crew placed overburden in a compact pile some 40 ft. high, figuring on later shoving it into the pit and opening up the ground beneath.

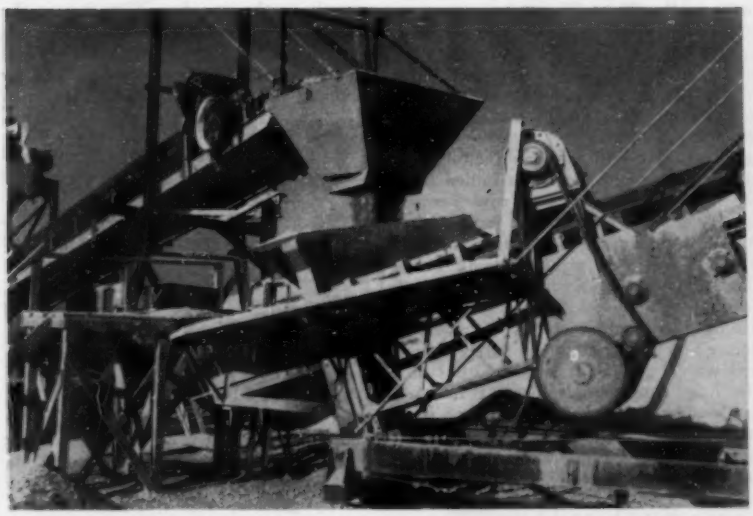
Ledge drilling was done with three Gardner-Denver wagon drills using Brunner & Lay 3-in. tungsten carbide insert bits and two G-D 600 compressors.

Stone was taken out by three Northwest shovels and 9 rear-dumps (4 Euclid 25 ton and 5 Allis-Chalmers 200's), working a single lift throughout the quarry.



● The radial stacker belt was operated by a 50-hp motor, with other motors for raising or lower belt and swiveling the frame on its track rail.

Some of the Plant Details Which Helped . . .



● Hopper which fed radial stacker. Note motor and chain drive for belt. (At right): Surplus grain storage? No, just modern safety storages for explosives, located several hundred feet away from the crushing plant on the opposite side of the job from the quarry.

. . . Maintain 1,000 Ton Hourly Stone Production

Rock was dumped via a 50" x 14½' cast manganese apron feeder over a 53" x 3' bar grizzly, into a No. 536H Cedarapids double impeller impact breaker—largest units of its type—to begin the first stage. Fine rock and clay passing the grizzly were bypassed by belt to a 48" x 14' double-deck horizontal vibrating screen equipped with a picker to take off clay balls from the screen. Fines scalped off here were wasted to a huge stockpile by a pair of 24" x 80' belts. The oversize from the screens went by return belt to the 42" x 157' primary conveyor. To minimize belt wear at the loading point, a stepped chute utilized the stone-box principle for the 10-ft. drop to the primary conveyor.

The conveyor dumped into a 30-ton surge feeding hopper, which fed to a 42" x 160' conveyor and to a tower-mounted screening and secondary crushing assembly.

Here the belt flow was split and re-split by four-way gates, designed to eliminate segregation that might have occurred thus far. Stone then passed through two symmetrical systems, each including a triple-deck

(Continued on page 132)

Plant Survives Tornado Direct Hit

The big rock plant erected at Eskridge, Kansas, early in 1956 by Concrete Materials & Construction Co., was swept by a tornado soon after getting into production. Although some of the belts were ripped down, the concrete-pedestal-supported crushing and screening equipment came through.

Equipment Seen At Road Show

(Continued from page 114)

six feet tall and have treads 2½ feet wide.

To assure ground contact of all six wheels at all times, and to dissipate road shocks, the Transporters have a flexible suspension system, utilizing an oscillating front axle and walking-beam rear axles.

Electric power for DC motors in the wheels, as well as for an AC motor used for steering, is provided by two LeTourneau-built generators driven by a 335 hp diesel engine.

A single control completely governs speed, power and braking. To steer the giant vehicles, an operator merely pushes a finger switch to the left or right.

Approximate dimensions of the Transporters are: over-all length 38 ft.; over-all height 13½ ft.; over-all width 12 ft.; cargo platform 25 ft. by 12 ft.; and height of the cargo platform 6½ ft.

New LeTourneau Transporter

For more information circle 181 on Service Coupon Page 16 and mail now.

Aggregate Production Team

A new product combination for aggregate production will be the Road Show feature at Pettibone-Mulliken Booth No. 813 by Universal Engineering Corporation, Cedar Rapids, Iowa.

A Universal Wobbler feeder combined with a Universal 3645 Impact Master is a single crusher, portable plant capable of closed circuit operation through high ratio of reduction.

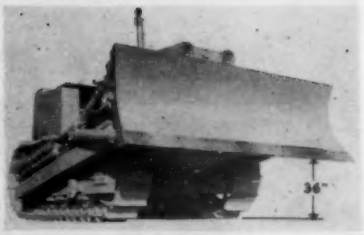
Effect of the Universal Wobbler feeder is to eliminate feed stoppage and reduce wear on Impact Master rotor hammers by taking out all 2 in. minus material ahead of the crusher.

In field operations, material removed by the Wobbler is deposited on the conveyor receiving crushed material from the Impact Master or wasted if large amounts of mud and dirt are present.

For more information circle 182 on Service Coupon Page 16 and mail now.

Angling Dozers

Among the new TerraTrac developments to be introduced at the Road Show by American Tractor Corporation, Churubusco (Ft. Wayne, Ind.), are two new heavy-duty crawler-mounted angling dozers in the 75 to 90 net horse-power diesel class. One of the biggest advantages claimed for these new units is the fact that the blade can be angled in any direction by finger-tip hydraulic control from the operator's seat. Complete operation takes less than one minute. Extra-high blade-lift (36 in. above ground), with 16-in. ground-clearance under the drawbar, also enables these new TerraTracs to travel through deep mud, over stumps, rocks, etc. without getting "hung-up". Both dozers are equipped with TerraTrac's exclusive new terramatic transmission, which provides non-stop power-shifting, plus three methods of power-steering, including counter-rotating spin turns within a minimum track radius of 5 ft. 7 in. Speeds range from 0 to 6.0 mph forward, and from 0 to 7.0 mph reverse. Both rigs are also equipped with power-boosting torque converter drive, which provides up to 20,000 lb. pull in the 75 hp Model 800, and up to 28,000 lb. pull in the 90 hp Model 1000 (assuming adequate weight and traction). A new 2-point system of centralized lubrication makes it possible to lubricate all lower track rollers on both sides of the tractor, with a 30 day supply of lubricant, in a matter of minutes.



New TerreTrac Angling Dozer

For more information circle 183 on Service Coupon Page 16 and mail now.

Vibrating Screed for Precast Concrete Work

A new twin-beam vibrating screed for precast work will be shown in Booth 339 by Stow Manufacturing Co., 65 Shear St., Binghamton, N. Y. In this screed the vibrating head transmits vibration evenly to the two beams so that as the screed is pushed along, the first beam strikes off the concrete and the second beam gives it a final finish. Any air bubbles left by the first beam are struck off by the second beam. The result is a thoroughly vibrated, smooth slab.

Twin-Beam Vibrating Screed

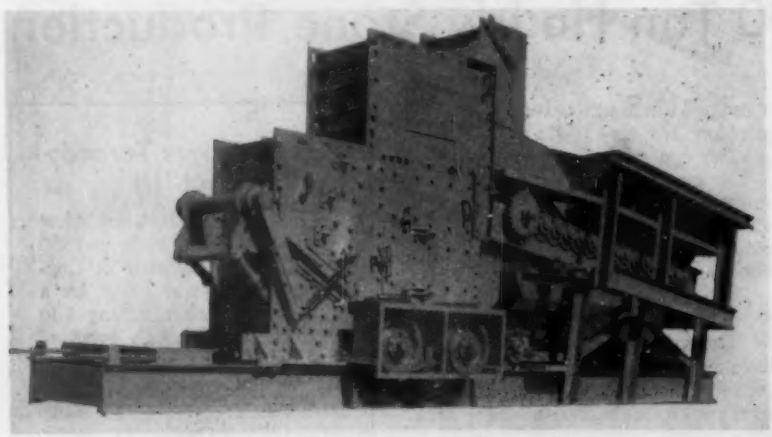
The Stow twin-beam screed is available with either a 1 hp electric motor or a 2½ hp gasoline engine, which drives a 2½ in. vibrator head at about 5,000 vibrations per minute. The motor or engine is isolated from the screed's vibration by rubber mounts. Handles on either end are isolated also from the screed's vibration by rubber mounts. The steel shod beams are available in lengths up to 6 ft.

For more information circle 184 on Service Coupon Page 16 and mail now.

Improved Diaphragm Pump

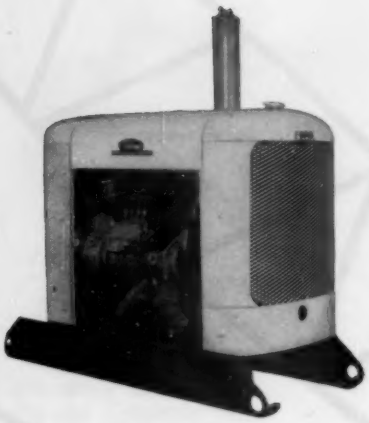
This improved version of the widely used diaphragm pump, featuring a self-cleaning, shock absorbing spring-bottom bow, will be among items of road builders' equipment exhibited by the Jaeger Machine Company, Columbus, O., at Booth 704. It is a 4-in. pump with a conservatively rated capacity of 6,000 gal. per hour at 10 ft. suction lift. In actual performance it handles up to 7,000 gal. at 10 ft. lift and up to 4,000 gal. at 25 ft. suction lift. Spring-bottom bowl

(Continued on page 131)



Wobbler Feeder Combined with Impact Master

Announcing
THE
FORD "220" DIESEL
...now available as a complete power unit!



POWER UNIT

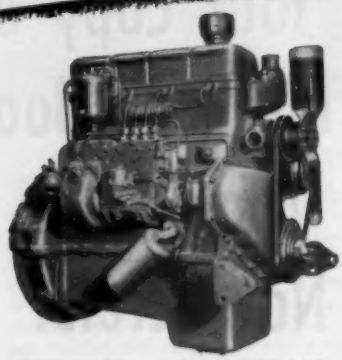
Ford
INDUSTRIAL ENGINES
AND POWER UNITS

Looking for really *modern* diesel power? Here it is in one complete 4-cylinder, 220-cu. in., skid-mounted power unit.

Modern design throughout makes this Ford diesel outstanding in power and economy. It delivers more actual sustained power at the flywheel than ever before possible in engines of comparable displacement. Exceptionally rugged in construction, it is quality-built throughout for longer life.

Features such as replaceable cylinder sleeves, aluminum pistons and balanced crankshaft, for example, give you peak performance, longer engine life. Overhead-valve efficiency boosts economy, makes servicing easier.

Drop in and see your Ford Industrial Power Dealer for full information on this modern, super-efficient Ford diesel. Or write: Industrial Engine Department, Ford Division of Ford Motor Company, P.O. Box 598, Dearborn, Michigan.



ENGINE ASSEMBLY

WET CYLINDER SLEEVES
Replaceable cylinder sleeves are positively located, yet easily removable —eliminating costly reboring. Synthetic rubber seal ring at bottom of jacket.

FOUR-WAY INJECTOR
Precision made four-way injector disperses diesel fuel evenly into each cylinder for efficient combustion, more power, and greater fuel economy.

ROTATING EXHAUST VALVES
Exhaust valves are free-turn type, designed to rotate each time valve opens and closes. Makes for even wear, helps maintain compression longer.

See the
FORD INDUSTRIAL ENGINES
at the:
AMERICAN ROAD BUILDERS ASSOCIATION ROAD SHOW
International Amphitheatre
Chicago, Illinois
Jan. 28—Feb. 2
Booth 825

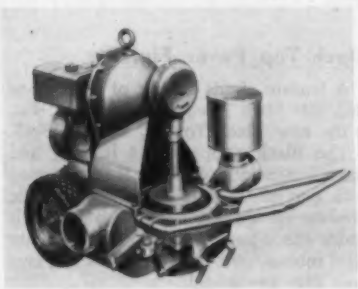
YOUR JOB IS WELL-POWERED WHEN IT'S FORD-POWERED!

. . . for more details circle 285, page 16

Equipment Seen At Road Show

(Continued)

design prevents build-up of clay or cement deposits and also protects from shock when stones or other objects are drawn into pump. Light weight, free-swinging valves and a surge chamber that takes the kick out of the hose, are other desirable features.



Jaeger Diaphragm Pump

For more information circle 185 on Service Coupon Page 16 and mail now.

Bottom Dump Wagon

A new 13-yd. bottom dump, featuring an overhung engine tractor of 218 hp and a top speed loaded of 28.2 mph will be on display at the Road Show by Euclid Division, General Motors Corporation, Cleveland 17, Ohio.

The S-12 bottom dump, rated at 40,000 lb. payload, carries up to 18 yd. heaped and makes a non-stop 180° turn in 31 ft., 2 in. Loading height is 9 ft., 5½ in.

The new unit consists of a standard Euclid 13 yd. hopper with a new hitch designed to couple it with Euclid's S-12 overhung engine tractor, making it interchangeable with the S-12 scraper. It has a five-speed transmission, full 90° hydraulic steering and 24.00 x 25 tires.

Euclid Model S-12 Bottom Dump

For more information circle 186 on Service Coupon Page 16 and mail now.

Diamond Type 77 All American Portable Crushing and Screening Plant

Portable Crushing, Screening

Capacity, speed and smooth action coupled with ease of travel are characteristics of the new portable crushing and screening plant which Diamond Iron Works, Division Goodman Manufacturing Co., Halsted St. and 48th Place, Chicago 9, Ill., will exhibit at the ARBA Road Show.

It operates on the "line-flo," rotor lift principle assuring a continuous flow of material. It receives the pit material at its loading hopper where a feeder deposits it on the main plant conveyor which delivers it to the top deck of a 2½ deck, 4 ft. x 12 ft. vibrating screen. Here it is classified with the fines being rejected if desired. Accepted material drops to the hopper below the screen and is discharged by the front delivery belt. The oversize from the top deck is fed into the 10 in. x 36 in. jaw crusher, oversize from the second deck is fed into the 36 in. x 22 in. roll crusher. The product from both crushers is dropped on the under crusher conveyor belt which loads it into the rotor lift where it is elevated to the main plant conveyor which completes the circuit after delivery to the screen to be classified. Travel height of the 77 is 12 ft. 6 in., operating height is 15 ft. 3¾ in. Capacity, based on 25% oversize passing 1 in. screen, is 160-225 cu. yd. per hour. Control can be either mechanical or electrical.

For more information circle 187 on Service Coupon Page 16 and mail now.

Curb and Gutter Machine

A new model curb and gutter machine with integral tamping attachment will be shown at the booth of Dotmar Industries, Inc., 502 Hanselman Bldg., Kalamazoo, Mich.

This attachment tamps the concrete ahead of the screed and trowel, eliminating hand tamping and spading.

An outrigger wheel, or bridge attachment, will also be demonstrated. This permits paver to lay curb and gutter immediately following placing and finishing of concrete for one-half the width of the street.

Attachments will be shown which quickly convert the Dotmar for sidewalk paving, integral sidewalk, curb and gutter, highway median strip or highway widening strip paving.

For more information circle 188 on Service Coupon Page 16 and mail now.

Loader-Backhoe Unit

A feature of the exhibit of J. I. Case Co., Racine, Wis., in Space 827, is an all new utility wheel tractor with precision matched front-end loader and backhoe. The outfit is built around the Case 310 utility tractor.

A wrap-around mounting frame is a feature of the loader. The heavy-duty hydraulic tank is a structural part of the unit. A sturdy radiator guard serves also to protect the headlights. The ⅜ cu. yd. bucket has a superior loading roll back and grading angle. The same is true of the high dumping clearance provided by the reach of the loader arms.

Rounding out the versatility of the new unit is the backhoe. It has a full 180° swing of the boom, 18 ft. 2 in. reach and 12½ ft. digging depth. Digging radius from pivot point is 16 ft. 2 in.

Dotmar Curb and Gutter Paver with Mechanical Tamper and Outrigger Wheel

1,500,000 Tons of Crushed Stone

(Continued from page 127)

4' x 14' screen and two Cedarapids 4033 hammermills for final reduction and/or return belt. In each side of this dual system, material initially passing the screens traveled by collector belt to a 36" x 80' rail-mounted, boom-type radial swiveling stacker.

All belts and screens were electrically driven, from 440-volt power supplied by two GM Detroit Diesel 110 generator units which also powered the lighting. The largest motor was a 50-hp unit on the stacker belt; other motors raised, lowered, or moved the belt. Six other 110's were in the plant —two on the primary breaker, and one each on the two pairs of hammermills.

Miscellaneous equipment included a Northwest No. 6 shovel for supplementary loading from stockpile, a Michigan 175-A tractor-shovel for reloading and for working under the stackers, and two scale houses.

Large-volume hauling of stone to the turnpike, involving a 15 to 22 ton load every two minutes and hauls up to 23 miles, was handled by two firms of Moran and Ramsey. A fleet of 70 or more trucks and semi's was kept in operation, supported by a separate maintenance depot near the plant.

Donald Evans served as superintendent and John Waalk night-shift superintendent for Concrete Materials & Construction Company, which is one of the nation's largest aggregate producers with 17 plants in Iowa and Kansas under general production manager Marvin Nelson and general sales manager Gene Mason.

Operator's hands are free to control bucket because boom swing is foot pedal actuated. Precision boom control is claimed to permit digging of level bottom trench and clean vertical side walls. A 90° bucket roll-back insures heaping loads without spillage. High tailgates or side extensions on trucks are cleared easily with the dumping height of 10 ft. 5 in. at start, 14 ft. 10 in. at end. Dumping reach of 11 ft. 1 in. permits end loading of trucks. If necessary, the backhoe can be disconnected in minutes freeing the tractor for other duties.

For more information circle 189 on Service Coupon Page 16 and mail now.

Black Topper Model PF-45

40-Ton Truck Crane

A new 40 ton capacity truck crane, Model P&H 575A, will be introduced at Booth 510 by Harnischfeger Corporation, Milwaukee 46, Wis.

The machine, completely designed and built by P&H (including carrier), will, it is stated, bring new mobility for over-the-highway travel, to a 40 ton capacity crane. This extra flexibility is accomplished through better distribution of weight with load being spread over 4 axels.

The new 575A-TC also incorporates outstanding P&H pioneered and developed features which have proven highly successful in field operation: smooth operating hydraulic control, independent planetary lowering, triple-safe boom hoist, live roller circle, plus many others.

For more information circle 190 on Service Coupon Page 16 and mail now.

Case Tractor with Backhoe

Black-Top Paver Finisher

A feature of the exhibit of Blaw-Knox Co., 300 Sixth Ave., Pittsburgh 30, Pa., is the new Black Topper, Model PF-45.

The Black Topper is 14 ft. long and has a base width of 11 ft. It is equipped with two 10:00 x 15, 14-ply pneumatic tires on the drive wheels. Front wheels under the 4-ton, 10 ft. wide hopper are solid rubber-tired 24 x 4 x 20 inches, two such tires per wheel.

Powered by a Continental F-162 gas engine which develops 30 hp at 1,500 rpm, the machine has six working speeds and a high travel speed of 8 mph.

Maximum width of the screed is 11 ft. Sections of the screed can be blocked or removed to pave down to 8-ft. widths. Hydraulic controls lift the screed for 8½ in. clearance. A propane system, which is available as an extra, provides screed heat. Tamping action is vertical with a speed of 1,000 rpm at 1,300 engine rpm. A V-belt with clutch drives the screed.

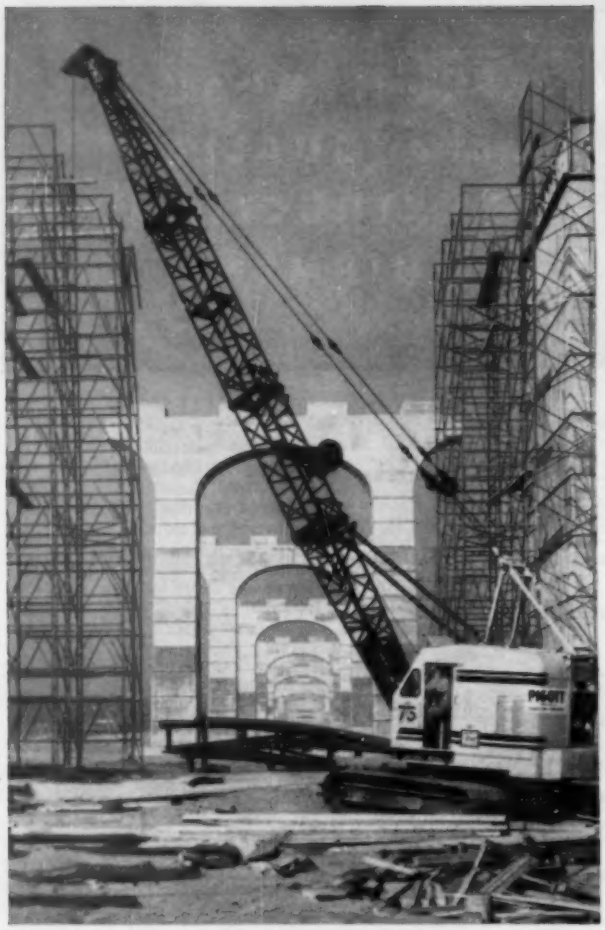
For more information circle 191 on Service Coupon Page 16 and mail now.

Diesel Pile Hammer

A new diesel pile hammer will be exhibited in Booth 608 by McKiernan-Terry Corp., Dover, N. J.

This completely self-contained pile hammer, requiring neither boilers nor air compressors, is light, mobile, versatile, and compact. The diesel hammer is presently manufactured in two sizes. The DE-30 has a 3,000 lb. ram that delivers 45 to 55 strokes per minute with an average energy per blow of 18,000 ft-lbs. It offers most economical driving with 1 to 3 ton piles at bearings from 40 to 90 tons. The DE-20 has a 2,000 lb. ram that delivers 45 to 55 strokes per minute with an average energy per blow of 12,000 ft.-lbs. It offers most economical driving with ½ to 2 ton piles at bearings from 25 to 60 tons. Production will soon be started on a DE-40 with a 4,000 lb. ram.

(Continued on page 138)



When you buy equipment
STANDARDIZE

GAR WOOD 75B EXCAVATORS give you the capacity you need, the easy convertibility you want to handle a wide range of jobs. Available on crawlers or as highly mobile 20-ton truck crane. Both units are fully convertible with a complete line of ¾ yard attachments.

GAR WOOD - ST. PAUL DUMP BODIES, matched with Strong-Arm hydraulic hoists, deliver the payloads you need at a lower net cost per payload hour. The line includes standard-duty, heavy-duty, extra-heavy-duty and telescopic models.

GAR WOOD TRACTOR EQUIPMENT reflects many years of construction machinery engineering experience. Gar Wood's line for Euclid includes a Tipdozer, Dozecaster, revolutionary new ripper and both hydraulic and cable control units.

GAR WOOD-BUCKEYE SPREADERS give you the speed you want, the accuracy you need to distribute materials at lowest cost. Hitching is fast, safe and automatic. Flow is accurately regulated for uniform or tapered spread.

GAR WOOD INDUSTRIES,

PLANTS IN WAYNE AND YPSILANTI, MICH.;

● Some of the highway administrators and industry leaders who participated in the Cornell conference.

How to Run a Highway Department More Effectively

Highway officials appraise management problems and techniques. Engineering manpower problem uppermost in week-long conference at Cornell University.

HIGHWAY officials from 26 states met at Cornell University in July of 1956, in the first national conference on highway management. Their objective in this pilot study as noted in the conference proceedings recently issued: to learn from other leaders, both within and outside of the highway field, how the "inner workings" of a state highway department can be made more effective.

Discussion leaders were experts in various areas of highway management from the Bureau of Public Roads and the Automotive Safety Foundation, as well as Cornell University professors of business administration. The American Association of State Highway Officials and the National Highway Users Conference jointly sponsored the week-long conference.

"The new National Highway Program will throw an unprecedented burden on state highway administrators," said Alf. E. Johnson, executive secretary of the AASHO. "They are going to have to adopt the management techniques of business corporations wherever it appears that doing so will get construction under way faster."

Highway engineers coming into positions of administrative responsibility are frequently faced with unfamiliar problems—in public relations, personnel, budgets, productivity, communications, recruitment, and training. The pilot conference at Cornell University was planned as an experiment to survey these problems, and to exchange a host of ideas on how to make the most of available engineering manpower.

Executive or Engineer? How They Differ

"Three special factors distinguish the executive from the engineer," Milton Mandell, chief of Management Testing Service for the U. S. Civil Service Commission, told the conferees:

1) "The engineer wants all the facts before he makes a decision, whereas the executive is lucky if he has half the facts before he has to make a decision.

2) "The engineer wants a safety factor of five or six; the only safety factor the executive has are good organization, good subordinates, his own wisdom, and his prayers.

3) "Engineers think primarily of materials and machinery; the first factor of every executive is the effect of his decisions on men—his employees, his colleagues, his superiors, and the public."

Boosting Department Efficiency

The 29 state highway men who participated in the meetings listened to reports of how departmental output can be boosted by:

- Adopting new plan production techniques designed to ease the work load of staff engineers.
- Seeking to revise legal obstacles which block quick implementation of the highway funds.
- Developing enlightened personnel

How Does Your Department Stack Up?

The Wisconsin State Highway Department is one which has increased its engineering productivity significantly by reassignment of duties. William Haas, director of Wisconsin's Administrative Division, who was largely responsible for the success of the reorganization, told fellow highway officials at the conference that they should reappraise their organizations with an eye to making them more attractive. He asked:

- "Is the highway department a desirable place to work?
- "What engineering achievements have we performed that are significant?
- "What have we done to inform the public and particularly other engineers about them?
- "Have our young engineers been 'hatching' new ideas? If so, what recognition, if any, have they received?
- "Does our department have a reputation for leadership based on its modern 'pioneering' policies and activities?
- "Do we have a really professional group or are we just a collection of 'hacks'?
- "Is our organization staffed with friendly individuals?
- "How do our hours of work and other working conditions compare with those prevailing generally throughout the state?
- "Is our equipment up to date?
- "Do we have a proper training program and 'climate for learning' for our new engineers?
- "Do we encourage our engineers to make decisions which are rightfully theirs to make? Do we delegate the responsibility and authority to make decisions expected of them?
- "Do we encourage our engineers to participate in professional groups?
- "Do we have a proper policy governing criteria for promotion? Is this policy clear?
- "What can we do to prevent or to reduce the turn-over rate of young engineers?

policies designed to bring out the best in all employees.

- Preparing potential executives for posts of responsibility.

Electronic "Brains" Used

Typical of the methods described by which planning and design could be speeded was the use of electronic "brains" to make traverse and earthwork computations. Charles E. Waite, deputy state highway engineer for California, described the process.

"The engineer in the drafting room instead of laboriously figuring and then checking the unknown bearings, distances or areas for a parcel of land, now sends in the available data to the Headquarters office in Sacramento. There the material is punched onto cards, fed into the machines, and the solutions mailed back. To complete 1,000 to 3,000 traverse courses daily in this fashion takes 12 to 24 hours of key punch and tabulating machine operation items, on the part of technicians and operators. (We are averaging 1500 traverses a day). It would take five to seven times as long for the same work to be done by engineers using manual methods.

"Currently, we are furnishing our eleven districts and the bridge Department at Headquarters with a daily service where up to two unknowns are calculated in any traverse. The limit as to the number of courses in any traverse was set at 98. The unknowns can be either a bearing or a distance or both. Traverse adjustments are also calculated by use of the compass and transit rules. Area of the closed traverse is furnished on request.

"In addition to saving engineering time, there is an actual dollars and cents saving—an estimated $2,000 monthly. A rate of five cents a course is charged. The manual method has been estimated at thirteen cents a course; twenty-five cents if checking is involved.

"A similar service is being furnished for earthwork. Earthwork qualities are being calculated for advanced planning, design and final pay quantities. Tabulations are furnished showing slope stakes, and areas of cut and fill, cubic yards of excavation and embankment and mass diagram ordinants."

Other Electronic Computations

Mr. Waite pointed out that other computations are possible by automation, thus releasing engineers for more skilled work.

"We have completed the procedures for the computing of quantities of steel by bar sizes for the Bridge Department and we are currently writing the procedure for the design of composite beams. A program is being written for the checking of aerial contour maps by mathematical formulas. This will reduce the amount of surveying required for setting up controls.

"We believe that the computing program will accelerate as more states enter this field. Programs will be made available through a sharing organization. In effect, there will be a pooling of engineering and programming talent. With this in mind, California has made available their completed programs on request," he said.

Such methods, he noted, have made it possible for the highway department to put a greatly increased program to work without a moment's delay.

In Ohio, right-of-way acquisition has been stepped up as a result of closer liaison between the Appraisal, Acquisition and Design Sections.

As soon as line and profile have been determined and approximate right-of-way taking lines can be established, a field review of the project is held by representatives of these sections. The joint review sometimes brings problems to light which might have necessitated major plan changes at a later, costlier stage.

Right-of-way plan production is being stepped up, also, so that negotiations can be conducted while construction plans are being prepared. Thus, when plans are scheduled to sell, the right-of-way will be available to the contractor.

Spell Out Man's Job

Speaking pointedly of the dilemma of some highway departments, Mr. Mandell of the U.S. Civil Service Commission declared:

"Small organizations which grow quickly need to look at their operating procedures and organization with fresh eyes. Informality (sometimes called 'sloppiness'), lack of formal methods for communication and coordination, individualistic methods of operation, and lack of administrative and operating reporting systems need not hinder severely the efficiency of a small organization, but they are fatal to the effectiveness of a large organization.

(Continued on page 198)

Equipment Seen At Road Show

(Continued)

A single load line is used for engaging, hoisting, and dropping the ram to start the hammer, and for hoisting and lowering the entire hammer.

A forced lubrication system provides a continuous flow of lubricant to the porous-chrome wearing surfaces. Cylinder and ram are each of one-piece construction, and special alloy steels are used for all parts subjected to high-shock stresses. Built-in fuel and lubricant tanks have sufficient capacity for over three days of economical operation.

For more information circle 192 on Service Coupon Page 16 and mail now.

New Aggregate Dryer

A new portable Trail-O-Dryer and dual feeder bin, announced by Littleford Bros., Inc., Dept. L13-219, 402 Pearl St., Cincinnati, Ohio, will be on display in Booth 622. The unit is intended to fill the need of contractors and road maintenance men for a small low cost aggregate dryer. The new Littleford dryer and bin combination will feed hot pre-mixed dry material to a Littleford Model 700 Trail-O-Patcher. The Trail-O-Patcher mixes the aggregate and asphalt together for discharge of "black-top" material directly into trucks without rehandling. The Trail-O-Dryer can be used for low cost drying of sand and aggregate for any use.

The Littleford Model 25T Trail-O-Dryer has a capacity of 15 tons per hour based on a removal of 5% free moisture and at a 310 degree F discharge. The Trail-O-Dryer will produce up to 25 tons per hour when drying aggregate for stockpile mixes or when moisture content is very low. The capacity will vary depending on the type of aggregate and the moisture content. The dryer is equipped with a Wisconsin TD-D 12.5 hp @ 2,000 rpm two cylinder gasoline engine and a low pressure air-atomizing type burner with a capacity of 7 to 40 gph. The Littleford Model 5T25 dual feeder bin has a capacity of 5 tons; a division in the bin provides for two, 2½ ton compartments.

For more information circle 193 on Service Coupon Page 16 and mail now.

Tractor Loader

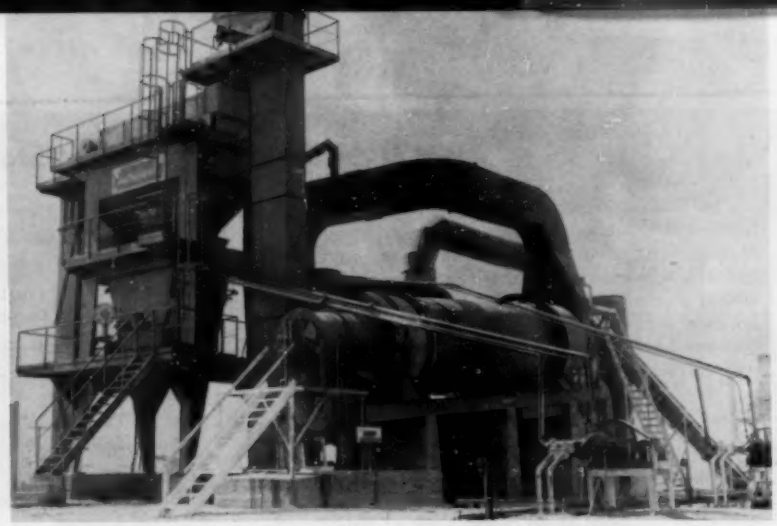
A new Tracto-Loader Model, the TL-20, will be introduced at the Road Show by Tractomotive Corporation, Deerfield, Ill. Features of the TL-20 include:

Complete power shift transmission with torque converter drive which will multiply engine torque up to 35%, and planetary axles which will provide more rim pull with less strain on the axles, transmission, U-joints, and differential.

The TL-20 will have power steering and four-wheel power brakes which can be operated by either the right or left foot. A separate positive locking, mechanical parking brake is also provided.

Power will be provided by an Allis-Chalmers' diesel engine developing 95½ hp at 2000 rpm.

For more information circle 194 on Service Coupon Page 16 and mail now.



New 6,000-Lb. Capacity Road-Master Asphalt Plant

6,000-Lb. Asphalt Plant

Featured in the display in Booth 235 of Standard Steel Corporation, 5001 South Boyle Ave., Los Angeles 58, Calif., will be the new Road-Master 6,000-lb. asphalt plant. This new line of Road-master plants is built in capacities ranging from four to six thousand pounds, all semi-portable.

The new Road-Master 6,000 lb. capacity unit (Model R-M) has an 8 ft. diameter dryer. Reported tonnages with this plant are more than 240 tons per hour.

The new Road-Master plants have features such as: oversized screen, dryer and elevator; dust seals on all units; and simplified push-button controls to reduce operator fatigue.

For more information circle 195 on Service Coupon Page 16 and mail now.

New Diesel Engines

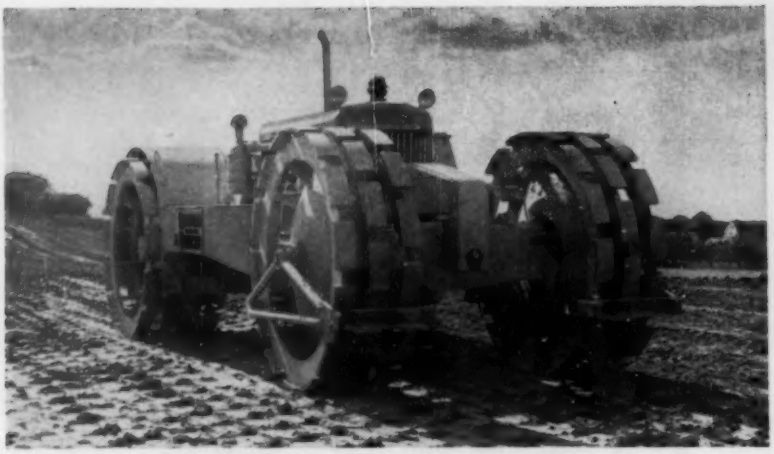
Two new series 71 Turbopower units and the newly-designed G-110 Roots Blower engine will have their first public showing to the construction industry at the Road Show exhibit of Detroit Diesel Engine Division, General Motors Corp., Detroit 28, Mich.

The new Turbopower engines are four- and six-cylinder units which utilize exhaust-driven turbines and air impellers to supplement the air supply to the cylinders. The result is stated to be an engine of increased efficiency with approximately a 17 percent increase in horsepower or a 15 per cent decrease in fuel consumption over corresponding Series 71 models. These advantages have been attained with no increase in weight-to-horsepower ratios. The engines are rated at 171 and 236 basic horsepower, respectively.

The new 6-110 Roots Blower engine is equipped with a high-capacity blower similar to that used on Series 71 models. The use of this blower is stated to effect several important improvements. Among these are reductions in height and length which provide a more compact engine with additional free space available for accessory drives.

For more information circle 196 on Service Coupon Page 16 and mail now.

Dual Feeder Bin and Portable Trail-O-Dryer



THE BUFFALO-SPRINGFIELD K-45 KOMPACTOR

How to select compaction equipment

The logical question to ask yourself when you are ready to buy new compaction equipment is: "Exactly what do I need the equipment for and how will I use it?"

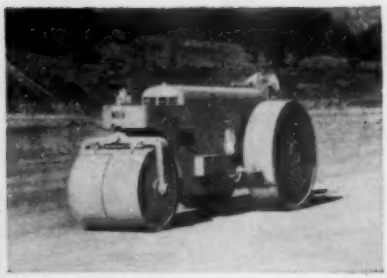
BASE FILL COMPACTION—This type of compaction demands equipment that will handle a wide variety of materials, give you the highest degree of compaction with the fewest passes. Buffalo-Springfield's revolutionary K-45 Kompactor is proving a real money-making answer for this type of work. It is self-propelled, relies on the "Interrupted Pressure Principle." All compaction effort is directed downward. Contractors testify they are meeting density requirements in one-fourth the time normally required with other compaction equipment.

FINE GRADE FINISHING — Buffalo-Springfield offers six 3-wheel rollers, ranging in capacity from 5 to 15 tons, to handle the large variety of materials found in fills, subgrades and unfinished bituminous pavements. The variable-weight 3-wheel roller is ruggedly built for years and years of hard, maintenance-free work.

Buffalo-Springfield's thoroughly-proved 3-axle tandem "walking beam" roller provides up to 60% greater tonnage compacted per day in superhighway construction, airport and military establishment jobs where specifications are extra strict.

ASPHALT FINISHING — Two-axle Tandem Rollers are designed especially for all surface finishing jobs. Ranging from 5 to 16 tons, Buffalo-Springfield Tandems are used for heavy-duty highway and public works projects, and all types of finishing, maintenance and repair work. A wide selection of models for the biggest to the smallest jobs are designed for long-life and profitable operation.

THE BUFFALO-SPRINGFIELD KX-3 AXLE TANDEM



3-WHEEL ROLLERS

TWO AXLE TANDEMS

SHORT ROLLING JOBS—Buffalo-Springfield's 3-5 ton portable roller is widely used for rolling driveways, sidewalks, parking and playground areas, and for patching and light finishing jobs. It is highly maneuverable and portable from job-to-job. Write today for full information on the type of equipment you need—or see your nearest distributor for an on-the-job demonstration.

3-5 TON PORTABLE TANDEM

BUFFALO-SPRINGFIELD
Roller Division-Koehring Company
SPRINGFIELD, OHIO

. . . for more details circle 243, page 16

AT LAST!

A versatile self-propelled scraper

that brings self-loading savings to everyone!

No matter whether you're a small contractor in need of a *first* self-propelled scraper...or a large contractor needing a *fill-in* rig—this amazingly low-priced Oliver is your first practical answer.

These are the facts: this all-hydraulic scraper is powered for the job, sized for the road and priced so you can have it *now!* It's fast, versatile, maneuverable and able.

Profit from its better self-loading ability in all forms of scraper work in earth, sand—digging, moving, grading, filling, dumping, and spreading.

It's tops for visibility and operating ease with exclusive low-mount hitch and finger-tip hydraulic control. It loads fast and full with special curved bowl design. High sweep apron with positive roll-out ejection gives clean, controlled spreading. It's 100% hydraulic; no cables anywhere!

All this in a more versatile, job-extending self-propelled at an easily afforded price that's actually *thousands* of dollars under other rigs. See your Oliver distributor.

VITAL STATISTICS

Capacity—6.7 cu. yd. heaped
Power—GM industrial 3-cyl., 83 h.p. diesel
Transmission—6-speed selective transmission (torque converter optional)
Steering—Positive hydraulic
Dimensions—19'1" (scraper); 30' scraper and tractor; 8'6¼" width
Tires—14.00 x 20 scraper; 18.00 x 26 tractor
Control—Fully hydraulic

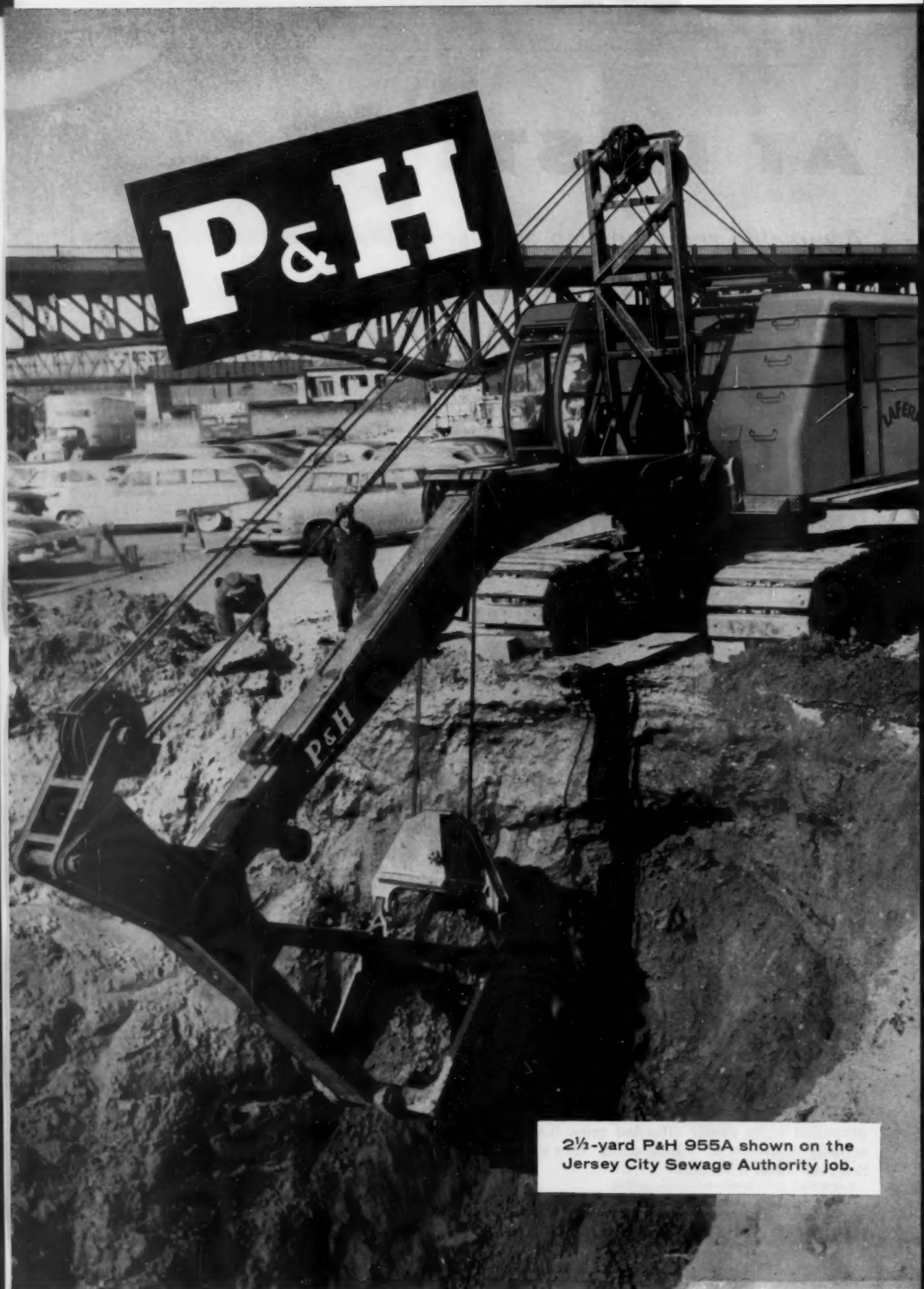
Get yours!

This complete picture and fact bulletin of America's lowest priced self-propelled scraper. Write now!

OLIVER **THE OLIVER CORPORATION**
400 W. Madison Street, Chicago 6, Illinois

a complete line of industrial wheel and crawler tractors and matched allied equipment

. . . for more details circle 202, page 16



2½-yard P&H 955A shown on the Jersey City Sewage Authority job.

9¢ a cu.yd....283½ yds.an hour*

with 2½ yd. P&H "Job-Designed" Trench Hoe

Each year more and more contractors are upgrading their equipment to the greater speed, power, accuracy and profitability of P&H "job-designed" power cranes and shovels.

The P&H 955A, pictured at the left on the Jersey City Sewage Authority job, digs 283½ cu. yds. an hour at a cost of 9¢ per cu. yd. (depreciation excluded) for the LaFera Contracting Company, Newark, N.J.

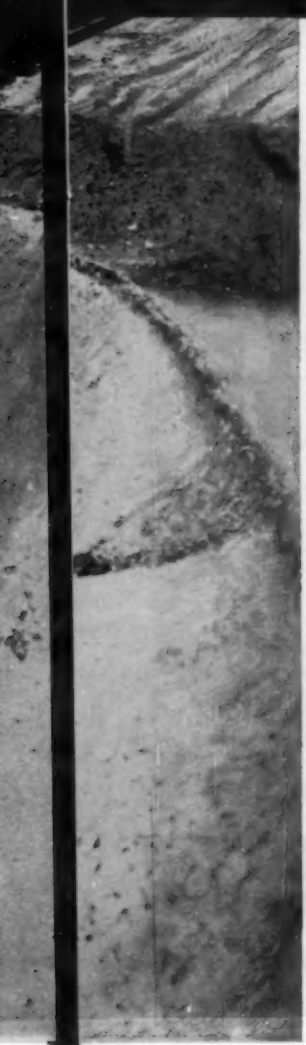
There's good reason for this typically profitable P&H performance. With the 955A it begins with Magnetorque†—the simplest and most advanced power drive known. Magnetorque transmits power for swings electro-magnetically—without friction, without wear. Swings are smoother, more easily controlled—and from 15% to 25% faster.

In addition to Magnetorque, you get P&H greater stability for more power at the tooth point—rapid reversing chain crowd for snappier dipper action—direct hydraulic control for smoother, easier control. This combination of outstanding P&H features gives the 955A the power, speed and flexibility to get the best performance out of your best operators.

Call your P&H dealer soon. No matter what the capacity needs or nature of your job, he can show you a P&H model that will help you dig more and lift more at a lower cost. Harnischfeger Corporation, Construction & Mining Division, Milwaukee 46, Wisconsin.

†T.M. Harnischfeger Corp. for electro-magnetic type coupling.

THE P&H LINE Truck Cranes: 8, 10, 15, 20, 25, 30, 35 and 40 tons
Shovels: ½, ¾, 1½, 1¾, 2½ and 3½ yards



Across the country P&H machines lead the field in power, speed, flexibility and profitable performance

INDIANA
For larger loads there is the big 3½-yard P&H 1055. At Standard Material Corporation's White River plant it is used to hold down costs in handling aggregates.

RHODE ISLAND
Gammino's of Providence depend on 35-ton P&H 555A-TC truck cranes for fast, economical performance in excavating on the big North-South Freeway job.

TEXAS
In the 1½-yard class, T. F. Jones Construction Co. profits from greater strength of the P&H 655B shown above on a Texas Highway Project in Hockley County.

*WRITE TODAY FOR VERIFIED P&H COST-PERFORMANCE FACTS

... for more details circle 222, page 16

Harnischfeger Corporation, Dept. 500-E
Construction & Mining Division
Milwaukee 46, Wisconsin

Gentlemen:
Please send me field report No. 5505 on the 2½-yard P&H 955A.

*Name*_____
*Title*_____
*Firm*_____
*Street*_____
*City*_____ *Zone*_____ *State*_____

Meetings

CALIFORNIA STREET AND HIGHWAY CONFERENCE—University of California, Institute of Transportation and Traffic Engineering, Berkeley, Calif.; January 23-25.

ASSOCIATED EQUIPMENT DISTRIBUTORS—38th Annual Meeting, Conrad Hilton Hotel, Chicago, Ill.; Jan. 27-30, 1957.

AMERICAN ROAD BUILDERS' ASSOCIATION—Road Show and 55th Annual Convention, Amphitheatre, Chicago, Ill.; Jan. 28-Feb. 2, 1957.

NATIONAL BITUMINOUS CONCRETE ASSOCIATION, Inc. Annual Convention, Conrad Hilton Hotel, Chicago, Illinois; January 31—February 2, 1957.

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS—Spring Meeting, Hotel Francis Marion, Charleston, S. Carolina; February 15-16.

ASSOCIATION OF ASPHALT PAVING TECHNOLOGISTS, annual meeting, Atlanta Biltmore Hotel, Atlanta, Georgia—February 25-27.

AMERICAN CONCRETE INSTITUTE—Annual convention, Statler-Hilton Hotel, Dallas, Texas; February 25-28.

43RD ANNUAL ILLINOIS HIGHWAY ENGINEERING CONFERENCE, Urbana, Ill., February 26-28.

9TH ANNUAL ILLINOIS TRAFFIC ENGINEERING CONFERENCE, Urbana, Ill., February 28-March 1.

AMERICAN CONGRESS ON SURVEYING AND MAPPING. 17th annual meeting, Shoreham Hotel, Washington, D.C., March 3-9, 1957. (American Society of Photogrammetry, 23rd annual meeting to be held in conjunction with the above meeting.)

UNIVERSITY OF UTAH—18th Annual Highway Conference, Salt Lake City; March 4-6.

ASSOCIATED GENERAL CONTRACTORS OF AMERICA, INC.—Annual Meeting Statler Hotel, Washington, D.C.; March 11-14, 1957.

Equipment rental suit

In a suit for the rental of road construction machinery the contractor contended he had agreed to pay $1500 a month. The ower of the machinery, on the other hand, claimed the agreed monthly rental was $2800. The contractor produced four checks dated in consecutive months, each for $1500.

"In a situation like this," said the Kentucky court, "we resort to the age old principle applicable to contracts. That is, where the evidence is conflicting as to the intention of the parties, their acts in execution of the agreement are most persuasive. The acts of these parties with respect to payment of $1500 rental, convincingly established contractor's contention."

Burchett v. Jones, 291 S.W.2d 32, Kentucky, June 1, 1956

Negligence outside contract

Negligence was charged in a suit against a Georgia construction company for failing to warn of a defective bridge approach in the performance of paving contract. The court said:

"There is no claim that the company had anything to do with the construction of the bridge or the approaches on the highway thereto or had done any act that caused or created a sudden depression in the highway near the bridge.

The construction company was under a contract to pave a section of the road on which the defective bridge was located but it is not claimed the company was doing any paving or any work at or near where the depression existed."

Schwarcz v. Charlton County, 89 S.E.2d 881, Georgia, September 13, 1955.

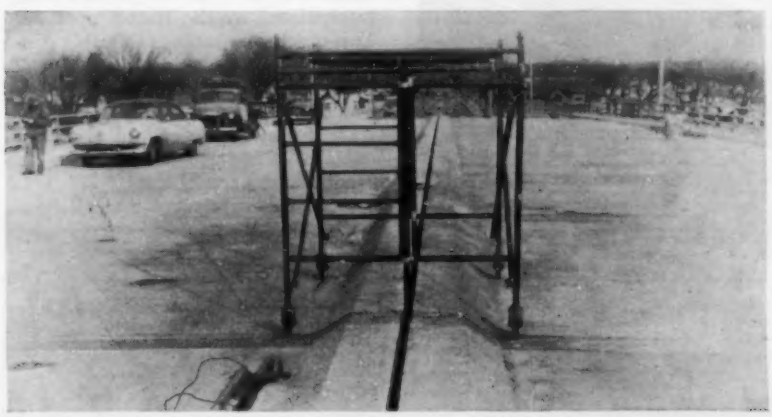
JOB AND EQUIPMENT IDEAS

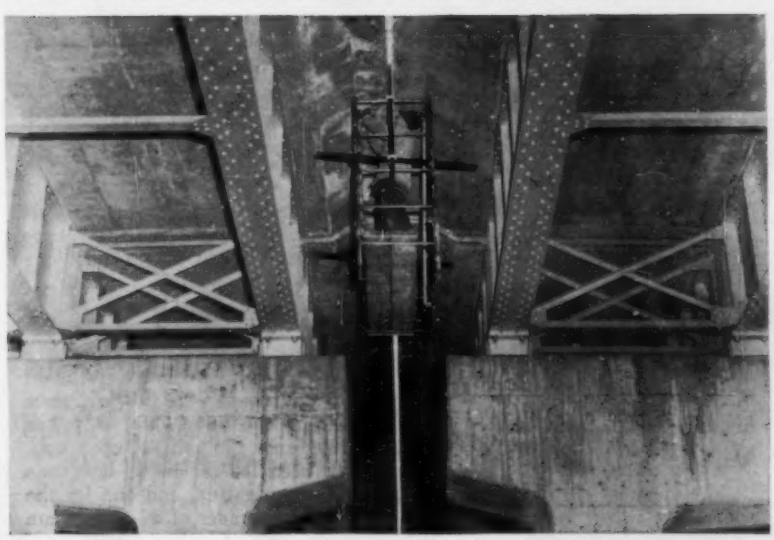
Scaffold support for bridge electrical work

ASSIGNED recently to do all of the electrical work on a large overhead bridge at Green Bay, Wisconsin, the Anderson Electric Company of Green Bay, contractors for the job, hit on a labor-saving method of using scaffolding.

The nature of the electrical work called for providing a sturdy working-platform below the surface of the bridge. Standing on this platform, the electricians could then work on the cables running along the underside of the 3-in. median expansion joint. As the area below the bridge was solid with railroad tracks, scaffolding from the bottom was almost impossible.

To provide this "below the bridge" working platform, the contractor erected a small rolling tower which straddled the expansion joint and the adjacent curbs on top of the bridge. A 10-ft. tube was hung from each end of the rolling tower by means of scaffold clamps. The tubes extended down through the expansion joint to the underside of the bridge where a small working platform made up of Waco ladder frames, braces, and planks was clamped to the tubes. By rolling the tower along the top of the bridge, the man on the working platform underneath could be placed anywhere necessary for him to work. Cost of the Waco scaffolding for this entire job ran to about $10.





● How a dolly-supported frame, up on deck, was used to support scaffold.

Backfill sifter speeds pipe line installation

TO CUT the cost of padding the ditch during drainage and pipeline construction in rocky ground, a special machine has been developed by M. J. Crose Manufacturing Co. This machine moves dirt for padding from the backfill of the spoil bank to the ditch—so that coated pipe is protected against damage from rocks when final backfilling is done. Introduced in the pipeline construction field, the machine is seen to have application also in connection with culvert, drain and storm sewer installation in highway work.

It has been estimated that the machine operation is 66 to 77 percent cheaper than protection of the coating by means of a hard, pliable, sheet shield, which is sometimes used as a substitute for hauling dirt for padding when the excavation spoil bank is of material otherwise too rocky for ready use. The thicker cushion provided by dirt padding is effective for armoring the pipe against the blows of a rock barrage during backfilling.

The padding machine picks up the dirt from the backfill in the spoil bank by means of a rotating head at the end of an auger-type conveyor. This delivers the dirt into the ditch at places where it is needed alongside the pipe and over it. The head and conveyor are supported in a boom

● Showing sifter in action, unit with boom raised, and view of trench with blanket of sifted rock-free material over the pipe.

● First bridge deck to be paved on the Massachusetts turnpike near Ludlow, Mass. Bayer & Mingolla Construction Co., contractor. The turnpike will have over 200 bridges.

JOB AND EQUIPMENT IDEAS—Continued

with two legs. The whole unit is attached to a large tractor.

The tractor driver operates the machine. On the boom is mounted a 36 hp VG4D Wisconsin air-cooled heavy duty engine. The auger conveyor tube for padding 16-in. pipe would be 12 in. in diameter; for 30-in. pipe the tube would be 16 in. in diameter.

Essentially, the padding machine functions to screen the dirt. The rotating head sorts or sifts but does not grind or pulverize. Nothing larger than 2-in. diameter material is picked up by the rotating head and put in the auger conveyor. The larger rocks and clods of dirt are left behind. These are later pushed into the ditch by backfiller or dozer.

An important feature of the padding machine is the hydraulic piston control manipulated by the tractor operator. This quick easy means of flexible control makes it possible to clear small obstructions without manipulating the winch to raise and lower the boom. With this hydraulic control, the head "nuzzles" along over the rocks in the backfill in the spoil bank.

With the addition of a small hopper next to the screening or cutter head, portland cement may be introduced into the auger section. The auger would mix the cement with dirt taken from the backfill and deposit a stabilized soil plug on top of the pipelines.

Special screed expedites concrete deck pours

Three special vibrating screeds are being used currently by Bayer & Mingolla Construction Co. of Worcester, Mass. to finish concrete bridge decks on the Massachusetts turnpike. These screeds strike off and shape the surface as they are pulled along by just two men.

Special underslung beams are necessary so that the end rollers can ride on I-beam rails mounted above the screed surface. Three different beams are required on this job, since the width of the lanes differ as well as the height of the rails at each end. One is used for the inside lane, one for the outside lane, and one for the interchange. Grades of 2% and 3% are

(Continued on page 150)

Which tires would you put on this truck?

SITUATION: Excavating for highway between Bonne Terre and Halifax, Missouri, Clarkson Construction Co. trucks haul dolomite from 1,000-ft. long, 20-ft. deep cut to nearby fill. Terrain—rough, with steep 30° downgrade. Average load of 23.49 cu. yds. weighs 61,074 lbs.

FIRESTONE'S RECOMMENDATION: Rock Grip Excavators for dual drives withstand load shocks, ward off cuts and bruises. Angled treads prevent side slipping. Rib Excavators up front make steering easier. These tires are built with tough cut-resistant tread rubber and Safety Tensioned *Gum-Dipped*® nylon cord bodies for extra strength and impact resistance.

JOB RESULTS: Clarkson trucks operate 10 hrs. daily in 5-min. cycles. *No downtime has been caused by tire failures!* Operators express complete satisfaction with lowered costs and raised performance standards, directly resulting from the recommendations of their Firestone Sales Engineer. He's the man who knows all tires and understands how to use them best for your profit, too. Contact him today—through your local Firestone Dealer or Store.

SUPER TRANSPORT
Most widely used heavy-duty tire for long, low-cost highway performance.

SUPER ALL TRACTION
Rugged, deep treads for off-road traction; smooth highway operation.

ROCK GRIP EXCAVATOR
Toughest tire ever built for severe off-road service. It's cut-resistant too!

RIB EXCAVATOR
Rugged, thick-bodied tire with great lateral stability for easy steering action.

Firestone

Enjoy the Voice of Firestone on radio or television every Monday evening over ABC

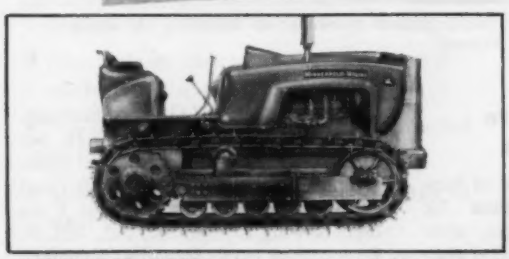
. . . for more details circle 260, page 16

Never before so *many* ways to beat job costs!

Every way you work these new POWERlined Minneapolis-Moline Wheelers you're making money. And never before could any industrial tractor work for you in so *many* ways! Here's MM high-torque, high-compression power with big piston displacement and moderate rpm—*real* lugging capacity. And to make that extra power pay you best, these new Wheelers have MM's exclusive Ampli-Torc Drive for 10 speeds forward . . . 2 reverse. You can *double* traction power and drop ground speed 48% . . . under load . . . without shifting or clutching. On PTO jobs, these new MM Wheelers give you power straight from the crankshaft, fully independent of the transmission. MM's integral, rear-mounted hydraulic pumps with capacities up to 35 gallons per minute offer highest hydraulic efficiency at low engine speeds.

MM Minneapolis-Moline

POWERLINED WHEELERS



NEW 445 CRAWLER—It's the crawler with features only MM could build—all the POWERlined advantages with new crawler traction. Available in gasoline or diesel models.

NEW 335 WHEELER—New performance, new class in this power and price bracket. Packs 47 bhp, big 167 cu. in. engine, wide choice of integrated hydraulic pumps, Ampli-Torc 12-speed drive.

FEATHER-TOUCH HANDLING—

The man who drives your POWERlined Wheeler devotes his attention to doing the *job*. There's no wrestling the wheel, even on the heaviest, muddiest ground; MM's built-in power steering supplies hydraulic muscles to do 90% of the work. One-lever Ampli-Torc Drive control, smooth-acting double-disc brakes, and scientifically located controls help cut jobs times to a brand new low.

CAPACITY THAT CAN TAKE IT—

Your POWERlined Wheeler carries its power on a backbone that can take the heaviest strains of front or rear loads. Heavy cast crankcase, transmission housings, and final drive units are joined by wide flanges to form single-unit rigidity. Heavy-duty industrial front ends and tires take rated capacities right in stride. This recognized MM construction means long trouble-free life under heaviest, continuous-load operation.

PROVE 'EM—ON THE *JOBS* YOU DO!

Find out what these new POWERlined Wheelers can do to speed *your* jobs. Ask your MM Distributor for an on-the-job demonstration, with the mounted equipment you need.

AT THE ROAD SHOW . . .

SEE 445 UTILITY WHEELER—57 Engine bhp.
445 INDUSTRIAL WHEELER—57 Engine bhp.
335 INDUSTRIAL WHEELER—47 Engine bhp.
NEW 445 CRAWLER—57 Engine bhp.

The **GOLDEN POWER LINE**

MINNEAPOLIS-MOLINE

INDUSTRIAL POWER DIVISION • MINNEAPOLIS 1, MINNESOTA

. . . for more details circle 200, page 16

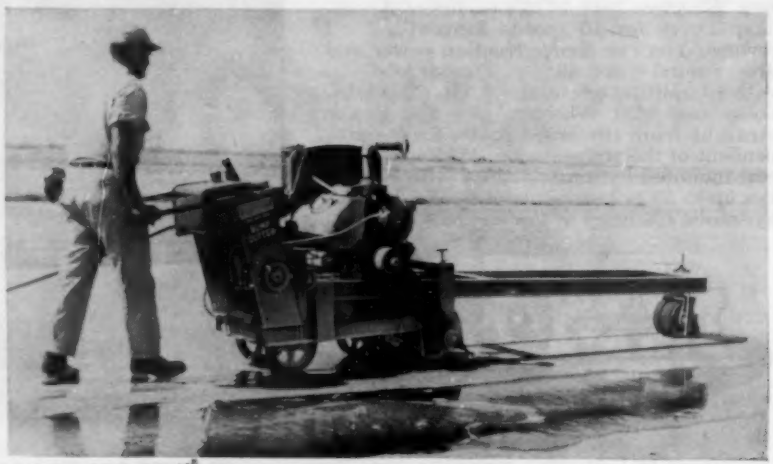
• Stow 24'6" vibrating screed finishing outer lane of bridge deck. "I-beam rail at far end of screed is mounted above the parapet reinforcing. Screed vibrates at 5,000 per minute.

JOB AND EQUIPMENT IDEAS — Continued

specified for different sections of each beam; this is easily accomplished using Stow's steel shod wooden screed beam.

The bottom section of each beam is made of 3x12 lumber while the gooseneck is 3x10 or 3x12 lumber, depending on the height required. Vertical bolts are used to fasten steel channel to the bottom of the beam and to secure the gooseneck.

The vibrating unit, powered by a 2½ hp engine, is mounted in the center of the beam. Since this vibrating unit, as well as the end roller assemblies are merely bolted to the beam, they can be mounted to different beams when this job is done. Wood is very highly satisfactory for screed beams, since because of its uneven grain structure, the vibrations are transmitted more evenly along its length.



• Concut precision concrete bump cutter working on taxiway 14, Davis-Monthan Air Force Base, Tucson.

High spots in concrete . . . machine Shaves them

PICTURED here is an area of taxiway 14 at Davis-Monthan Air Force Base, Tucson, Arizona, after one pass of the Concut precision concrete Bump Cutter.

The joint running vertically at the left is a formed contraction joint. The joint running horizontally across the bottom of the picture represents the edge between the concrete taxiway paving and adjacent asphalt paving.

The maximum depth of cut on the pass pictured was approximately ¼ inch. Close examination of the cut area reveals the slight ridges produced for better traction by using spacers between the cutting blades.

Length of the taxiway involved is 3,300 ft.; width 20 ft. Total area of 66,000 sq. ft. was bump cut. Two passes were made over all surface covered, cutting to a maximum depth in some places of ½ in. depth, in order to meet A.I.O. specifications. Speed of cut was 90 to 100 ft. per minute, over an area 16½ in. wide.

The machine manufacturer and subcontractor on this job was Concrete Sawing Equipment, Inc., 331 N. Santa Anita Ave., Arcadia, Calif.

Back-up alarms help avoid fatal accidents

The Safety Council of the Corps of Engineers, North Pacific Division, found that backing of construction equipment accounted for a major portion of fatal accidents in the division. As a result, the division's construction contracts require that mobile construction equipment be equipped with reverse signal alarms. Fully automatic back-up alarms are now available commercially, this bulletin notes, and contractors have also developed their own devices, rear wheel activated.

• Panel of the concrete taxiway surface, as it appeared after being cut down by new machine.

CONTRACTORS "GO" for GRADE·O·MATIC GRADERS....

"..the T-700 will do more work than any other two motor graders combined.."

— so says Frank M. Hubbard, President of Hubbard Construction Co. It is a feeling that's shared by those who have had *actual experience* with Galion GRADE-O-MATIC Graders. Features which have earned this enthusiastic approval include:

- Engineered balance of power and weight.
- Tremendous torque multiplication automatically as needed.
- Power-shift transmission and elimination of foot clutch.
- Automatic adjustment of engine speed to meet all loads or conditions.
- Prevention of engine lugging or stalling.

It will pay you to use Galion GRADE-O-MATIC Graders on your big jobs.

THREE GRADE-O-MATIC SIZES

Model T-700
190 h.p.
40,125 lbs.

●

Model T-600
140 h.p.
30,420 lbs.

●

Model T-500
125 h.p.
25,765 lbs.

Write for literature.

Hubbard Construction Company
General Contractors
Orlando, Florida
July 20,1956

The Galion Iron Works & Mfg. Co.
Galion, Ohio

Gentlemen:

We have now had our Galion Model T-700 Motor Grader in operation for several months and I feel that we now can tell you by actual experience what we think of this fine new Galion grader.

In our opinion the T-700 will do more work than any other two motor graders combined that we have ever owned.

Our maintenance and operational expenses have been very satisfactory and we are very well pleased and satisfied with this new grader and would highly recommend it to anyone in the market for a new grader.

We might also add that we own a 118 grader which we are very well pleased with and it has been in continuous use for over two years with practically no maintenance during this time.

Galion, in our opinion, builds a very fine product and we look forward to doing more business with you and your distributor in the future.

Sincerely,

HUBBARD CONSTRUCTION COMPANY

Frank M. Hubbard

FMH:ra

Frank M. Hubbard, President

ESTABLISHED GALION 1907

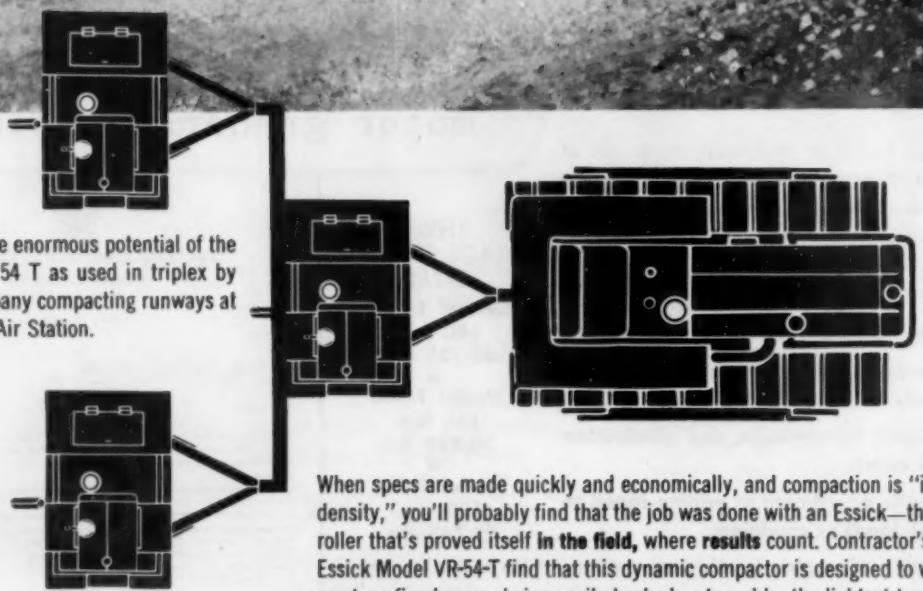
MOTOR GRADERS · ROLLERS

TRENCH ROLLERS · PORTABLE ROLLERS · 3-WHEEL ROLLERS · TANDEM ROLLERS · MOTOR GRADERS

THE GALION IRON WORKS & MFG. CO., General and Export Offices, Galion, Ohio, U.S.A.
Cable address: GALIONIRON, Galion, Ohio

. . . for more details circle 221, page 16

in place at density...



Drawing shows the enormous potential of the Essick Model VR 54 T as used in triplex by S. J. Groves Company compacting runways at Lakehurst Naval Air Station.

When specs are made quickly and economically, and compaction is "in place, at density," you'll probably find that the job was done with an Essick—the vibrating roller that's proved itself **in the field,** where **results** count. Contractor's using the Essick Model VR-54-T find that this dynamic compactor is designed to work in the most confined areas, being easily backed or towed by the lightest tractor. 4 to 6 single passes with an Essick will compact 21″ of granular material to the most rigid specifications.

If you're looking for compaction **plus** profit, you'll find that the Essick Model VR-54-T has an amazingly low first cost, a low operating cost, and can actually save **two-thirds** on spreading and rolling operations.

—and for sheer power and ability, the Model VR-54-T is used in both tandem and triplex hook-ups for the most potent package of compaction tools available today.

ESSICK MANUFACTURING COMPANY

1950 SANTA FE AVE., LOS ANGELES 21, CALIF.

850 WOODRUFF LANE, ELIZABETH, NEW JERSEY

AFFILIATED WITH THE **T. L. SMITH COMPANY,** MILWAUKEE, WISC.

ESSICK®

. . . for more details circle 295, page 16

NEW

HERE'S A NEW MACHINE FOR BIG PROFITS on small black top paving jobs

Now, *for little more than half the cost* of a big paver, you get the new, small, light weight Blaw-Knox PF-45 Black Top Paver that will give you big profits on small paving jobs. Similar in design and construction to the big Blaw-Knox Model PF-90 Paver-Finisher, the Model PF-45 Black Top Paver is the first machine of its kind that is designed specifically for small to medium sized bituminous paving jobs. It has a combination of speed, power, maneuverability, versatility and low operating cost that has never before been put into a black top paver requiring so low an investment.

You can see this new Black Top Paver at the Road Show, Jan. 28 to Feb. 2, at the Blaw-Knox Booth, No. 727 located on the corner of the Ohio Turnpike and 10th Avenue East in the Exposition Hall of the International Amphitheatre. Your Blaw-Knox distributor also can give you complete information.

BLAW-KNOX

. . . for more details circle 284, page 16

BLAW-KNOX COMPANY

Construction Equipment Division

44 Charleston Ave., Mattoon, Illinois

New Forming Technique Produces Sawed Joints At Less Cost

FIGURE 1

...uses KORK-PAK® as dummy joint filler; removes filler after concrete cure by sawing

An interesting new joint forming and sawing technique, in which lengths of KORK-PAK®—a non-extruding expansion joint filler, are used as a dummy joint filler and then sawed out by an inexpensive 3/8" carborundum blade after the concrete has cured, has been developed and used with good results by T. L. James Construction Company on a Mississippi State Highway Project. Location of the Project was on Route 51, south of Jackson, Miss.

Clean, straight 1/4" joints (Fig. 1) are produced at a fraction of the cost of sawing 1/8" joints in the ordinary manner with a diamond blade. Joint sawing speed was considerably increased, and the resulting 1/4" wide joint was sealed with "Zero-Lastic."® a single component, cold-applied joint sealing compound manufactured by Servicised Products Corporation, Chicago, who also produce the KORK-PAK material used on the project.

KORK-PAK DUMMY JOINT is embedded in concrete. *Figure 2*

KORK-PAK is a composition of asphalt and granulated cork, formed between two sheets of asphalt saturated paper. It is non-extruding and is readily handled without breakage. It is a general purpose joint filler widely used on highway and turnpike projects. The KORK-PAK material was easily sawed out and did not gum up the blade, as did other types of asphalt and hard-board joints.

HAND FINISHING over embedded joint produces smooth surface. *Figure 3*

Essentially, the new technique consists of embedding 1/4" wide x 2" high lengths of the KORK-PAK in transverse and longitudinal joints at the time the concrete is being placed (Fig. 2). Transverse joints were spaced at 31'4" intervals. The small surface sections of concrete disturbed by insertion of the joint were finished by hand. (Fig. 3).

After the concrete cured, a saw, equipped with a 3/8" carborundum blade quickly and easily removed the top inch of the KORK-PAK (Fig. 4) leaving the other inch undisturbed in the concrete. When desired, the blade can be set to remove all of the dummy joint and seals up to 2" or deeper can be obtained.

AFTER CONCRETE CURES, top 1" of dummy joint is sawed out. *Figure 4*

Using the KORK-PAK dummy joint technique, the contractor reported getting from 2500 to 3000 lineal feet per blade. The 1/4" joint obtained was practical to seal and gave the pavement the same riding qualities as one in which the joints were sawed by a diamond blade in the conventional manner.

SEALING JOINT — "Zero-Lastic" Cold-applied material is pumped into joints from container. *Figure 5*

After cleaning the sawed joints, the contractor applied Servicised "Zero-Lastic" Joint Sealing compound (Fig. 5) in the usual manner.

More information and specific details on the material and equipment used on this project are available from Servicised Products Corporation. Write for the Servicised Catalog which contains valuable data and complete details on Servicised Asphalt, Cork and Rubber composition products for the construction industry.

SERVICISED PRODUCTS CORP.
6051 W. 65th Street Chicago 38, Illinois

See us at Booth No. 104 (near Main Turnpike and Avenue H) American Road Builder's Show Jan. 28—Feb. 2nd Chicago Amphitheatre.
. . . for more details circle 296, page 16

44 Charleston Ave., Mattoon, Illinois

Something NEW in diamond blades!

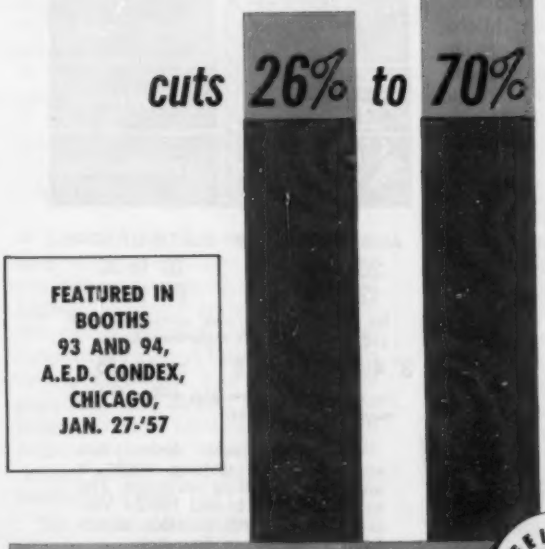
THE FELKER *di-lock*

cuts 26% to 70% more footage in concrete!

That's a fact. First tests show Felker DI-LOCKS are out-cutting other standard diamond blades by as much as 26 to 70% in 24 to 48 hour, highly siliceous concrete!

Felker DI-LOCKS are the result of an intensive research program, greatly enlarged facilities and a *totally new manufacturing technique!* The DI-LOCK process locks the diamonds in the rim by utilizing a new combination of chemical and furnace techniques. This process literally coats the new alloy around each individual diamond particle. The rim is denser, sounder...totaly free of coarse granules, minute gas pockets, voids and other microscopic defects which may limit diamond blade life by weakening the grip on the diamonds! DI-LOCK grips tighter...lasts longer!

FEATURED IN BOOTHS 93 AND 94, A.E.D. CONDEX, CHICAGO, JAN. 27-'57



MODEL 364 FELKER CONCRETE CUTTER—The ultimate in a powerful, heavy duty machine for production cutting. New positive, no-slip cog-belt type spindle drive puts all the engine h.p. at the blade. New hydraulic variable speed power drive. Many other features and models available!

FELKER DI-MET SINCE 1924

Get Felker DI-LOCK Diamond Blades.
Available from all Felker Distributors.

Remember, Felker means Footage!

FELKER MANUFACTURING CO.
Torrance, California

First in Diamond Cut-Off Blades!

. . . for more details circle 291, page 16

Traffic Safety

New driver data, better traffic laws needed

Highway and traffic engineers accept responsibility for improving traffic safety standards in the tremendous highway program ahead, but need more facts about driver motivation. And they must have cooperation in the form of complete modernization of highway and traffic laws.

That was the consensus of speakers before the Traffic Section of the National Safety Council, held October 24, in Chicago. The program was arranged by the Engineering Group of the Traffic Section as part of the program of the National Safety Congress. Ralph Michel, associate traffic engineer, department of streets and sanitation, city of Chicago, presided.

Speakers at the session included: William E. Billings, executive vice president, Ohio Safety Council; Joseph J. Feuchter, president, Traffic Associates, St. Louis, Mo.; J. Carl McMonagle, assistant director, field services, Highway Traffic Center, Michigan State University, East Lansing; John T. Hanna, assistant director public safety, Department of Public Safety, Richmond, Va.; and Jerome D. Franklin, city traffic engineer, Grand Rapids, Mich.

Mr. Billings, who opened the program with a paper on "Responsibility of the Engineer in a Traffic Safety Program," said that the new 41,000-mile national highway system is expected to save 3,500 lives each year because of high design and safety standards. "Just how successful the safety aspects and efficiency of this project prove to be in actual practice in urban areas, will depend in large measure," Mr. Billings said, "upon the ability of the traffic engineer to lend his experience to the coordination of expressways with the existing street system and its rehabilitation to serve primarily local traffic."

• *Complete Restudy Needed.* Mr. Billings said that in many areas the new freeways will require a complete re-study of the traffic pattern, with a reappraisal of projects previously considered essential. He declared that traffic engineers must have a place on the planning and design team if such aspects of traffic movement as access and egress from new expressways are to function properly.

Traffic engineers, this speaker said,

have contributed to an improved accident rate over the past 30 years but must now perform in an even more creditable manner in the face of an expected 82 million cars and trucks traveling some 800 billion miles in 1966.

"If the legislators, the educators, the police and the judiciary are content with the status quo," Mr. Billings said, "53,00 citizens will be sacrificed on our highways in 1966, assuming the same accident fatality rate as in 1955. If we are to hold our own, the frequency rate in 1966 must be cut back to 6.6 fatalities per 100 million miles."

Mr. McMonagle, whose paper was entitled, "The Engineer Accepts His Responsibility in a Traffic Safety Program," was formerly director of the Michigan State Highway Department's Planning and Traffic Division.

He resigned last summer to take a professorship at Michigan State University and also to be assistant director for field services at the University's new Highway Traffic Safety Center.

Behavior Studies Needed

Mr. McMonagle referred to highway engineering as "the major branch of engineering which is concerned with the needs, the wishes, and the behavior of people, singly or en masse." He said that recognition of the problem of the individual and of the mass of individuals is a step which the modern highway engineer must mount before he can claim competence in his field.

● *Research Into Causes.* The speaker declared that even the most progressive highway and traffic engineers and highway planners know too little of the causes of what he called, "increasing suicide and manslaughter tolls on our highways. The designer," he said, "can offer limited excuses for his failure to take advantage of known weaknesses and failures of vehicle drivers which could be mitigated by intelligent design."

Mr. McMonagle urged that specialists in psychology, psychiatry, and in other subjects investigate, isolate and identify characteristics of drivers in order to provide beacons and guideposts for the highway designer and traffic engineer. "We are not going to get the ultimate in highway safety engineering," he said, "until we do have the essential criteria which can be adduced only by coordinated scientific investigation."

A warning that complete modernization of the nation's highway system

(Continued on page 194)

LOOK AT REO

"That's what it takes in a truck to keep rolling in our business"

...reports Hall Sand and Gravel, Inc., Denver, Colorado.

"We bought our first Reo in 1945, a used Dumper and it's still on the job. It proved to us that, dollar for dollar, there's no better truck to be bought.

"*Rugged strength* in a truck is a prime factor in our business, and Reo really has it. We wonder how they can take such punishment. No other truck has the guts that's built into these trucks.

"Our short-run stop-and-go hauling, requires more gear shifting than an over-the-road haul from Denver to Chicago. This is tough on a truck engine, and we've never had an engine failure in all the time we've been operating Reos."

Reo specializes in custom building heavy-duty trucks for tough jobs like those in the construction business. On or off-highway models with gas or LPG Gold Comet Engines—sixes or V-8's, from 107 to 235 h.p. Reo's advanced *short-stroke, wet-sleeve* Gold Comet engines are available in rugged Reo chassis or for replacement. *They are all backed by a 100,000 mile or 1 year warranty.*

THE HALL FLEET OF REOS delivers sand, gravel and concrete in the South Denver area. As much as 2,000 tons of sand and gravel and 338 yds. of concrete per day.

FOR "REAL GUTS!"

Hall's Reo "transit mix" model A630, 220 h.p., is equipped with a 6 yd. mixer (44,400 lbs. GVW). It saves 30 minutes per trip on a 20-mile run up an 8% grade, from Denver to Castle Rock. Rolls without laboring at 40 miles per hour on the highway.

REO MOTORS, INC.

LANSING 20, MICHIGAN • TORONTO, ONTARIO

SUBSIDIARY OF BOHN ALUMINUM AND BRASS CORPORATION

REO

WORLD'S TOUGHEST TRUCK

TRUCKS, BUSES AND GOLD COMET ENGINES FOR ORIGINAL EQUIPMENT, INDUSTRIAL AND REPLACEMENT—GAS OR LPG

. . . for more details circle 259, page 16

● Figure 1. Paving breakers require a continuous flow of compressed air at operating pressure. If pressure drops here, air tool activity is handicapped or completely stopped causing the labor loss of a number of workmen due to downtime of the machine for repairs. Adds up to increased construction costs.

How To Get The Most Out of Your Portable Air Compressors

Photos and Data Courtesy Compressed Air and Gas Institute, Cleveland, Ohio.

From a purely economical standpoint, a construction engineer can reduce operating costs and at the same time increase production, by adhering to certain maintenance considerations governing the operation of portable air compressors.

The portable air compressor is a highly developed, carefully engineered piece of machinery designed for maximum compactness with minimum weight and exceptional efficiency. By its very nature it is a piece of equipment requiring special attention, if operating costs are to be controlled by eliminating costly breakdowns. Routine maintenance of a gasoline engine compressor presents no particular problem. However, special attention should be paid to certain, more specific maintenance considerations.

● *Slipping the Clutch.* One of the most common abuses to portable air compressors resulting in increased maintenance costs is the habit of slipping the clutch. On most compressors, the clutch is standard equipment, designed especially to reduce the torque when starting the engine. "Slipping the clutch," is a method used to bring the engine up to speed gradually, but such practice results in permanent damage to the part.

Clutch Breakdown

From a maintenance standpoint, the clutch should always be engaged, or disengaged, quickly and positively. Frequent abuse of the clutch usually results in eventual breakdown. This means increased operating costs and the loss of valuable manhours while the clutch is being repaired.

● *Proper Fuel.* Many operators of portable compressors feel that one fuel is the same as another as long as it operates the engine. This misconception causes unforeseen troubles affecting the performance of the machine.

High-priced fuel is not the answer here, nor is "high antiknock" gasoline the salvation to reducing maintenance caused by the use of improper fuel. Unlike the automobile, the compressor operates under vastly different circumstances. Consequently, fuel for a compressor should be selected on the basis of "quality," rather than price. A high antiknock rating does not necessarily guarantee a good gasoline, and blended gasolines using a cheap base stock will only bring valve sticking, carbonizing etc., causing downtime and unnecessary repair bills.

Not only is "quality" gasoline important to the smooth operation of a compressor, but the cleanliness of a fuel is highly essential. The fuel should be completely free of foreign matter, and filter screens should be cleaned frequently. Special attention to carburetors and allied parts of the fuel system will also pay dividends.

Foreign matter in diesel fuel causes trouble with injection pumps and nozzles. Diesel filters and screens provided to protect the engine should be cleaned at regular intervals. Such parts will protect the engine against grit and other impurities found under normal operating conditions, but they will not protect the engine against the continuous use of dirty fuel.

It is important to guard against using cheaper grades of fuel oil, which have been "blended" with oil stocks

to obtain the approximate gravity specified. Such oils usually contain dirt and other trouble-causing elements.

For best results, diesel fuel should be a distilled oil of the proper gravity and octane rating for the specific use intended. It is also to the operator's advantage to purchase gasoline and fuel oil from companies entirely familiar with compressor engine requirements. Such a practice will reduce future maintenance costs.

● *Pressure Drop Is Costly.* Eliminating pressure drop is another maintenance consideration frequently overlooked in operating a portable compressor. When pressure drops, air tool activity is handicapped or completely stopped causing a waste of labor while the cause is corrected to bring the pressure back to effective working capacity.

Pressure drop can be eliminated by paying careful attention to the selection and size of the hose or piping carrying the air from compressor to point of use. Air lines should be kept in good condition. They should never be run over by a truck or other heavy equipment. It is also important to guard against entanglement, or any heavy object falling on the line and crushing or damaging it.

Location of the compressor is another important factor in eliminating pressure drop. If the compressor is located some distance from the work site, transmitting the air through steel pipe lines will avoid excessive pressure drop.

● **Figure 2. Pressure drop here would render the backfill tamper useless. Pressure drop can be eliminated by the proper selection, size, location and maintenance of hose connections and lines.**

● **Figure 3. Location of unit at work site is an important factor in operation of the compressor. Machines have out-of-level limitations which should never be exceeded. Proper location, some distance from the work site as shown here, eliminates tangling of air lines and permits clean dust-free air to enter the machine.**

Compressors Connected

Several compressors are often connected to one common air discharge line when a large volume of air is required for a job. In such a case, the use of a rigid steel pipe connection between the common discharge header and the receiver on each individual portable unit should be avoided. A rigid connection frequently results in rupturing the air receiver, whereas a flexible connection, such as a piece of rubber hose, installed between the receiver and the connection to the header or pipe line, will assure the degree of flexibility necessary to eliminate rupturing and consequently maintenance problems.

The conditions under which portable compressors operate are vastly different from a stationary reciprocating, or huge centrifugal compressor. Consequently, many mobile compressor maintenance problems are completely removed from those concerning the above-mentioned type.

● *Air Receivers, Fuel Storage Tanks.* Air receivers and fuel storage tanks of portables require considerable attention since dirt, grit and weather conditions have a direct bearing on the function of this equipment. Air receivers and fuel storage tanks on most portable compressors are designed to the specifications of the A.S.M.E. code for unfired pressure vessels. Particular maintenance requirements are necessary to assure effective workability.

(Continued on page 200)

buy from the line of strongest design... Hercules!

Hercules Model 1215 high-speed telescopic hoist and CD-20 batching body handles four 5,150 lb. batches for J. A. Jones Construction Co.

for high-speed, cost-cutting batching work...

New Hercules hoist raises and dumps *in less than 6 seconds!*

2,500 ft. of 24 ft. x 9 in. slab per 9 hour shift! That's the amazing production pace maintained by J. A. Jones Construction Co., Charlotte, N. C. on a recent by-pass job near Mansfield, Ohio—thanks to Hercules' new high-speed telescopic hoists.

Because the batch trucks could back into the skip, dump, and pull clear *in 11 seconds*, the dual-drum pavers were able to deliver a 37.4 cu. ft. mixed batch at 51 second intervals!

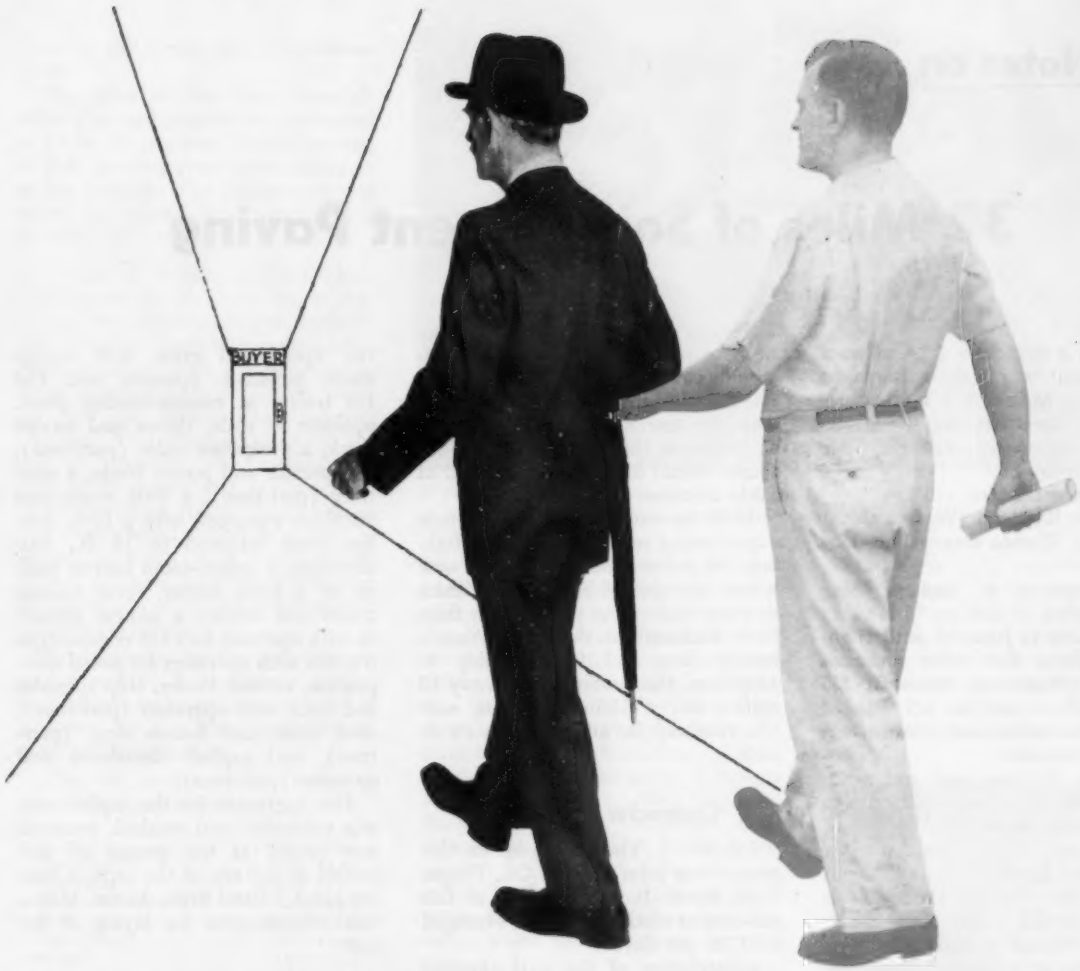
Especially designed for Jones' use on this job, the new Hercules high-speed hoist raises to full dump position in 4 to 6 seconds. A special new bleeder valve provides hydraulic cushioning at the end of the lifting stroke. And, accelerating the truck engine at the top of the stroke provides a rapid 4 to 10 in. rising and falling motion of the truck body. Complete, clean dumping of each batch is assured, without "frogging" the truck. According to the contractor, Hercules 6 second, 4 batch equipment has reduced his investment in batching trucks 20%.

See your Hercules distributor . . . he'll show you how this new hoist and batching body can boost production and cut costs on your paving jobs, too. Call him now! AA-4512

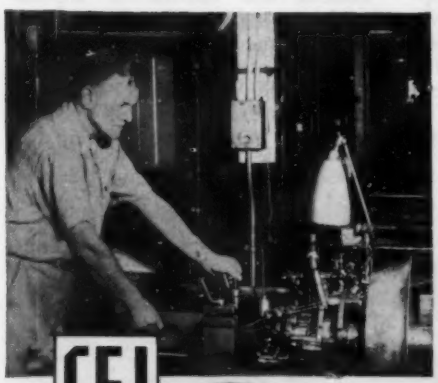
See us at the Road Show—Booth 423

HERCULES STEEL PRODUCTS COMPANY, GALION, OHIO

. . . for more details circle 236, page 16



Your Wickwire Rope Distributor and our closer operator ...ready to help you



This closer operator—running a machine which forms our rope—is with your Wickwire Rope Distributor every time he makes a call.

True, he's physically in the mill, where he's carefully conducting this final fabricating operation. But, whenever your Wickwire Distributor makes a call, he has the full assurance that every foot of Wickwire Rope has been carefully assembled by skilled craftsmen . . . and that it will give you long, trouble-free service on your job.

It's just one more reason why your Wickwire Distributor knows he's got top-quality wire rope, slings and strand to sell . . . and that these products will serve you well.

CF&I WICKWIRE ROPE A CF&I PRODUCT

4085

A PRODUCT OF THE COLORADO FUEL AND IRON CORPORATION

. . . for more details circle 306, page 16

Job Notes on

32 Miles of Soil-Cement Paving

IN 1955, a stretch of 32.4 miles of soil-cement was built in the heart of southern Minnesota's fertile farm area. The three-part project involving two contractors was on State Trunk Highway 30.

The improvements:

(1) New Richland (Waseca County) to west Waseca county line, 13.4 miles.

(2) Mapleton to Amboy (Blue Earth County) 10.5 miles.

(3) Amboy to Junction with Highway 15 about two miles south of Lewiston (Watonwan County), 8.5 miles of soil-cement plus 4.5 miles of experimental soil-cement construction and other materials.

Highway 30 runs east and west, crossing several streams tributary to the Minnesota River. The valleys of this area are highly productive in corn and soy beans. Highway 30, an important farm-to-market road, is a feeder to several major North-South highways connecting trading centers.

This area is composed generally of heavy loam soils. Those sections of Highway 30 built with soil-cement in 1955 were formerly gravel roadways. They were restricted each year to light loads during the spring break-up and were susceptible to deep rutting in wet weather. Maintenance was a chronic problem.

To accommodate farm trucks and other service vehicles, there was a need to provide a durable road that would carry 7-ton axle loads. Another factor in choosing soil-cement was the scarcity of satisfactory base aggregate in the vicinity. The closest source would have required a haul of 20 to 25 miles.

With the exception of the 4.5-mile experimental sections, all of the Highway 30 improvement was built with a 6-in. soil-cement base. A 2-in. thick mat was laid on the two sections from New Richland to the west Waseca county line, and from Amboy to Mapleton. The Amboy to Highway 15 section has a 1½-in. plant-mix mat. The roadway for all sections is 24 ft. wide.

Contractor on Project

Job No. 1. The contractor on this project was John Dieseth Co., Fergus Falls, Minn. In the building of this soil-cement road, production averaged 4,500 ft. per day.

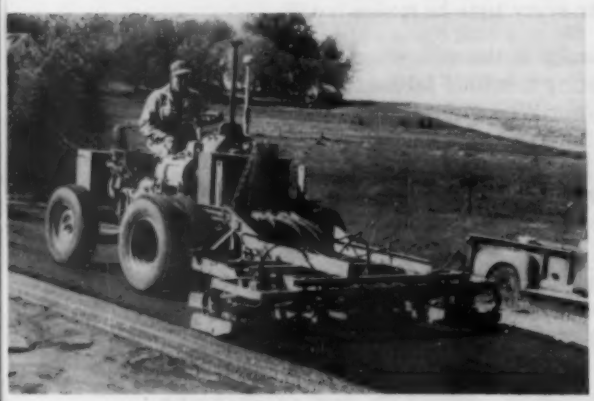
Construction of the soil-cement highway is well pictured in the equipment and personnel engaged. Fifteen trucks were used to haul sandy borrow soil to the site. Two pitmen operated a Barber-Greene loader. Two heavy tractors, two power blades, two pneumatic tire rollers, and three water trucks with operators for each, made up most of the outfit.

In building the soil-cement base, the operational crew with equipment, included: operator with Cat D4 tractor at cement-loading plant, operator at scale, driver and service truck, a sheepsfoot roller (part-time), an operator and power blade, a rototiller (part-time), a P&H single-pass stabilizer equipped with a 10-ft. mixing drum widened to 12 ft., four shovelers, a spiked-tooth harrow pulled by a farm tractor, three cement trucks and drivers, a cement spreader with operator, two D6 crawler-type tractors with operators for initial compaction, cement loader, chip spreader and truck with operators (part-time), steel roller and broom drag (part-time), and asphalt distributor and operator (part-time).

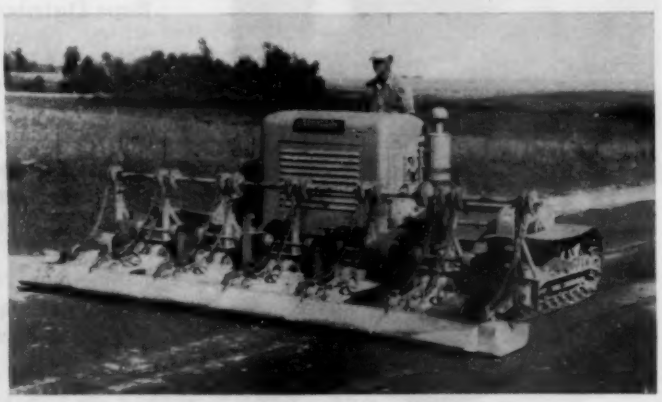
The aggregate for the asphalt mix was stockpiled and crushed, screened and loaded at the gravel pit and hauled to the site of the asphalt mixing plant. Ulland Bros., Austin, Minn., was subcontractor for laying of the mat.

● *Job No. 2.* The John Dieseth Co. was the contractor also for construction of this 10.5-mile link. Robert E. Dieseth was construction superintendent.

The same equipment and forces were used as for job No. 1 except that a Pettibone Wood Model 54 Roadmixer was used instead of the P&H stabilizer. The asphalt surfacing was



● Jackson vibrator was used on one contract to compact the bottom 4-5 in. of the sand-cement mixture.



● The top 2 in. of mix was compacted by an Internation vibro-tamper. A pneumatic-tired roller then followed.

done by Jay Craig and Co., Minneapolis.

The price of the base materials other than soil-cement was estimated at 10 to 20 per cent higher because of lack of satisfactory base aggregate in the vicinity. The soil-cement was mixed and placed at an average rate of 4,000 ft. a day.

● *Job No. 3.* Builder of this 8.5-mile portion was Jay W. Craig Co., Minneapolis. Production averaged 3,000 ft. per day. The Craig Company used a P&H stabilizer with an 8-ft. mixing drum together with a Jackson vibrator and an International tamping vibrator. After compaction with the aid of vibrators, the section was brought to crown and grade with a motor grader. A spike-toothed harrow was then routed over the section to remove any surface compaction planes. A broom drag was drawn over the surface prior to final finishing with rubber-tire rollers.

Nels Johnson, Mankato district engineer, and M. J. Mortenson, Mapleton, project engineer, supervised construction for the Minnesota Department of Highways.

The unit costs on the foregoing projects averaged:

Processing	$ 0.22	sq.yd.
Cement (7%)	0.40	sq.yd.
Aggregate	0.007	sq.yd.
Bituminous Material	0.02	sq.yd.
Sand cover	0.040	sq.yd.
Gravel haul	0.010	sq.yd.
Water	0.033	sq.yd.
Total, soil-cement base	$ 0.73	sq.yd.
Plant-mix top	0.50	sq.yd.
TOTAL	$ 1.23	sq.yd.

Contractor Cooperates on "Flare" Safety Campaign

School children who get burned playing too near flares around construction, or who mischievously extinguish them when they are needed for traffic protection, are the object of a campaign in Nassau County, L. I. Hendrickson Bros., Inc., one of the leading contractors of the region, is cooperating with the county highway department on this unique safety campaign.

The effort was sparked by the recent cave-in of construction excavation in Brooklyn which snuffed out the lives of six small children. Since the mishap, various officials and agencies have been pointing accusing fingers in many directions, with little constructive to offer.

Hendrickson Bros. stepped into the picture shortly after the disaster. Milton Hendrickson, the firm's President, contended that barricades and a watchman supplied by a contractor would be a temporary safeguard, but would not prevent a child, uneducated safety wise, from using a construction site as a playground. This contention was proved recently when a group of children scaled an 8-ft. anchor fence at a building site in New York City, started a truck crane, and toppled the machine into the excavation.

Long Island is the scene of furious construction activity, noted Mr. Hendrickson. As with suburban areas throughout the country, booming expansion has brought miles of open excavation for sewers, drainage, highways, buildings and other improvement, which are hazardous for children.

As an upshot the safty engineering department of this contracting firm, as a community service, has devised a safety poster program for the elementary schools in Nassau County. For the most part the posters will deal with construction site hazards. Other posters will feature various pieces of modern and costly construction equipment, with explanations of their use. The first three posters, designed to interest the children in the lower grades, deal with excavations, road flares, and sewer pipe.

Hendrickson Bros., Inc., with headquarters at Valley Stream, L. I., has already aroused wide interest in this campaign, and it is expected that contractors and officials in other urban communities will undertake similar activities.

● P&H single-pass stabilizer mixed ½ to ¾ mile per day of soil-cement base. Note uniformity of cement spread on roadway next to mixer.

● Milton Hendrickson and A. H. Patterson, of Nassau County, N. Y., exhibiting one of the first of the new safety posters.

● Completed soil-cement pavement with bituminous topping on TH-30 in Blue Earth County, Minnesota.

How to Avoid Dangerous Excavation

Cave-ins, Slip-Outs and Slides

Answer Not Always Simple

Contractor's men and highway engineers who are looking for simple rule-of-thumb ways to avoid disastrous excavation failures, should read this review of pointers given at the recent National Safety Congress.

DANGEROUS and costly excavation failures can be prevented by attention to natural laws. But the solution often requires careful engineering judgment.

So said George F. Sowers, consulting engineer, Atlanta, Ga., speaking at the Construction Section of the National Safety Council. His paper on "Failures Resulting from Excavations, Their Cause and Prevention" was part of the National Safety Congress, held recently in Chicago. Mr. Sowers is professor of civil engineering at Georgia Institute of Technology and consulting engineer with Law-Barrow-Agee Laboratories in Atlanta.

Ignorance of natural laws and short-sighted efforts to cut costs are among the contributing causes of excavation failures, often resulting in loss of life and heavy property damage, according to Prof. Sowers. His paper was illustrated with colored slides showing disastrous excavation failures in various parts of the country.

Prevention of excavation failures is an old and extremely important engineering problem, Prof. Sowers said. "From an engineering standpoint," he pointed out, "an excavation is not a simple structure. The most complex material with which the engineer must deal is soil. Soil is a heterogeneous mixture of air, water and solid matter of many kinds which in the past has been thought to be beyond any analysis." He said that modern soil mechanics has removed much of the mystery from soil behavior and has provided the engineer with methods of analysis which can be used in the solution of practical problems.

Studying Excavation Failures

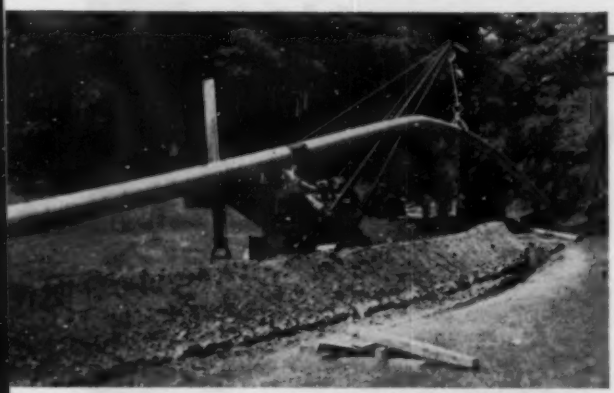
A study of excavation failures, Prof. Sowers said, leads to a number of conclusions: First, that the danger of failure is not remote, but a frequent cause of major construction accidents.

Second: That failures are not an act of God but the result of violation of rather complex but established laws of nature.

(Continued on page 173)

● **Examples of inadequate bracing of an excavation, where the soil face caved in as a result.**

The CLEVELAND 80W



–a SIDECRANE

- Lays pipe • 30,000 Ft. Lb. Capacity
- Power Boom... Up and Down • 4 Line Speeds
- Long Reach...21 Feet • Sets Bends, Valves
- Unloads...Strings • Pulls Sheathing, Etc.

–a BACKFILLER

- Backfills Fast...20 Passes Per Minute
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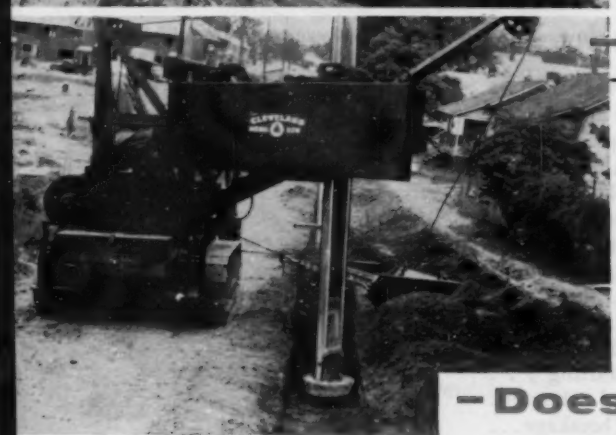
- Stays off Completed Work • Backfills from Either Side of Trench • Works Safer... Parallels Work • Fits All Job Conditions



–a TAMPER

- Fills and Tamps Simultaneously
- One Machine...One Operator Does it All
- Meets Density Specifications • Tamps from the Bottom Up • Parallels Work... No Straddling • Tamps Wider...Tamps Safer

–Does ALL 3 Related Jobs–*Better!*

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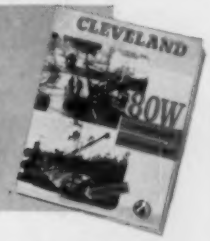

Good Everywhere

THE CLEVELAND TRENCHER COMPANY

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. . . for more details circle 304, page 16

When it comes to torque converter-equipped crawler tractors, few contractors can claim the experience of Edward J. Petrillo, president of Yonkers Contracting Company, Inc., Yonkers, N. Y. He's been advocating torque converter drives ever since Allis-Chalmers first introduced them for heavy-duty tractor use back in 1940.

There's good reason for Mr. Petrillo's use of torque converter drives. Says his Chief Purchasing Agent & Equipment Manager, Charles S. Campello: "Our Allis-Chalmers HD-21's, and their predecessor HD-20's and 19's, have never been down due to torque converter trouble—and we've used them on some of the biggest, toughest jobs in the East. All we ever do is give them normal field maintenance, which consists of checking the torque fluid level and conventional lubrication. Time required for this is insignificant."

Currently Mr. Petrillo has more than 50 A-C Crawler Tractors equipped with A-C torque converter drives. And, of course, A-C standardizes on Twin Disc Torque Converter components. But there's much more than just trouble-free operation behind his choice of torque converter drives. Production-wise, the torque converter automatically matches output torque to load conditions—with minimum or no gear-shifting . . . cushions out shocks and vibrations to reduce parts wear and breakage . . . and provides accurate load control.

Put a torque converter-equipped machine on your next job—particularly where operating conditions are really rough. See for yourself what Twin Disc Torque Converter drives can do for *you*!

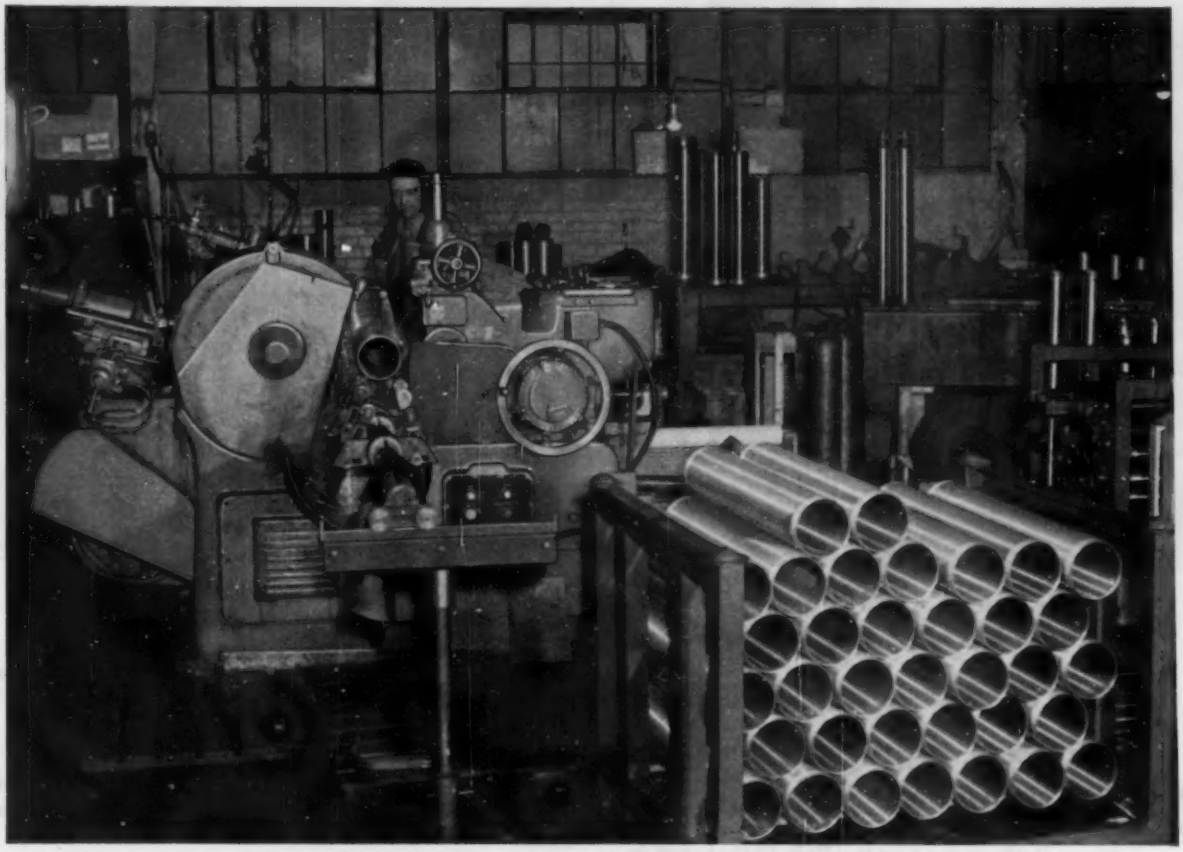
Working with scrapers, these A-C HD-16's use torque converter drives (optional). Current HD-21's use torque converter drives as standard . . . but with either model the torque converter components are Twin Disc's.

TWIN DISC
Torque Converters

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division), Rockford, Illinois

. . . for more details circle 214, page 16

. . . more payload . . . more profits with Galion!



Duo-scopic hoist cylinders are ground mirror-smooth on this modern centerless grinder.

to assure top quality . . . top performance

DUO-SCOPIC CYLINDERS are GALION-built

You can depend on the quality, performance and durability of the Duo-scopic cylinders in your Galion telescopic hoists. That's because Duo-scopic hoist cylinders are designed by Galion engineers . . . built by Galion craftsmen . . . backed by over 40 years of hoist design and construction leadership.

Find out how Duo-scopic hoists can increase payloads and profits on your jobs. The Galion distributor near you has all the facts. Call him today!

Magnified view of cutaway cylinder shows seal-protecting wiper ring—compact chevron seals—large bearing area of sleeve guides.

GALION Allsteel Body Company

Galion, Ohio

See us at the Road Show—Booth 423

Bros shows Road Builders 3 ways to reduce roadbed costs in '57

Subbase and subgrade materials from native or over-size rock

Montana photo (left) shows how the Bros PREPARATOR is making substantial savings on subbase costs by reducing native rock at the rate of up to 400 cu. yds. per hr. 22 special alloy steel hammers driven at high speed break rocks along cleavage lines; accepted gradation percentages and clean, sharp angles of friction result in the materials produced. Easily handles up to 24" diameter stuff. It can be towed by any 40 to 50 HP tractor.

This machine is also a real money-maker in pulverizing old blacktop materials for re-use. Reduced to uniform size, materials are easily blended with new asphalts.

Base and surface course materials mixed faster and to greater depths

Minnesota photo (center) shows the Bros ROTO-MIXER using every bit of its "beef" in mixing old road materials full of big rock, slab-like asphalts and cobblestones; heavy-duty design brought it through without damage. The machine features a 6" solid steel rotor shaft; simplified split-sleeve tool plates, load absorbing tool sockets, variable speed transmission and independent hydraulic control of the hood and the rotor.

These features add up to correct control of mixes, minimum of repair and breakdowns and deeper and faster mixes.

Earthfill materials bladed and compacted in one operation

Minnesota photo (right) shows Bros LEVEL BLADE ATTACHMENT combining grading and rolling into one operation on a regrading project. This dual effort eliminated a patrol grader from the embankment job. Consolidation allowed scrapers to run in high gear; two to three extra hauls per hour were reported. Equal or greater densities than giant tampers achieved on this project also resulted from this combination blade-roller work.

Consolidating old roadbed materials in a horizontal stockpile with the blade-roller permits scrapers to spread on top without bogging down. Spring-loaded blade has 7½" vertical adjustment for cross-overs and grading in gumbo.

• • •

Cost savings vary from job to job, but the best way to make maximum savings on roadbed construction is by putting this Bros equipment to work for you. (And don't forget about our tremendous pneumatic tired roller line.)

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1. proper use of all available gear ratios
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3. reduced driver fatigue; safer operation

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AXLES

Eaton 2-Speed Axles not only let drivers select from TWICE the conventional number of gear ratios, but they make these ratios available at finger touch. Result: drivers use the right gear ratio for every road and load condition; engines operate in their most economical speed range; stress and wear are reduced on all power-transmitting parts. Trucks cost less to operate and maintain; last thousands of miles longer; and bring higher allowances at trade-in time.

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NEW THOR SELF-PROPELLED ONE-MAN DRILLCAT

First on-the-job reports prove Drillcat delivers more work, bigger profits, in less time

CHECK THIS PROOF DIRECT FROM THE JOB

PAID FOR ITSELF IN ONE JOB

A net profit of $15,000 in one week on rock drilling jobs was reported by one contractor—another, equipped with five Thor Drillcats paid for them in three months from extra profits.

SAVES OVER 2½ HOURS SET-UP TIME

You can set a Thor Drillcat in drilling position—ready to go—in 20 to 25 minutes.

FAST WHEN THE GOING IS TOUGHEST

One man on a Drillcat tugged a 600 c.f.m. air compressor ½ mile over rough terrain, drilled five holes and was back with equipment at his starting point in only two hours.

DRILLING DOWN HOLES. Two 7½ h.p. air motors propel this compact (6 ft. 9 in. overall) Thor Drillcat where no other crawler can go. More than enough power to pull its own air supply. Drilling down holes is no chore for Thor's Drillcat. Using the powerful model 105M drifter and chain feed mast, the hydraulic accumulator keeps boom rigid at all times. This means less steel breakage and less wear on chuck parts.

DRILLING TOE HOLES. The Thor Drillcat is completely flexible. The boom and mast are lowered flat to the ground for toe and lifter holes. Twin reversible drive air motors permit easy maneuvering to any position, any angle. (Note position of controls for easy operation.) A "dead man" control for all air valves is standard equipment on the Drillcat.

These exclusive features make Thor model MM-2 Drillcat the most productive rock-drill you can buy! Ask any Thor distributor for a Drillcat demonstration.

● Thor's super-powered 105M drifter rock drill. ● Rugged Thor BW-2 wagon drill mast and air control motor. ● Self-propelled with two 7½ h.p. Eimco air motors, power aplenty to haul itself and air supply. ● Rigid frame, proved in tractor design, no moving or wearing parts, long lasting, low maintenance. ● Aircraft-type accumulator in hydraulic system absorbs shock. ● Simple hand-operated track take-up. No tools required. No track locks required. ● Large flat platform. Ideal for operator when drilling toe holes, good for tool and fuel storage.

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Avoiding Dangerous Excavations, Cave-ins

(Continued from page 166)

"In spite of our knowledge, failures continue," the speaker said. "Of course, some engineers and contractors are ignorant of the cause of the trouble," he declared, "and so try to rely on their past experience which may not apply to each new situation. In other cases, however, the hope of getting by with less expense has governed what was done. This is shortsighted, for the cost of a failure can be tremendous and is reflected in high insurance costs."

● *Lists Causes of Failures.* Since excavation failures, Prof. Sowers said, are caused by stresses which exceed the strength (or weight) of the soil, then anything which increases the soil stress or decreases its strength could lead to failure. He gave the principal conditions leading to increased soil stresses as follows:

1. An increase in the cut depth. This increases the load on the soil in the bottom face of the cut, increases the soil tension at the top and increases the unbalance in the bottom.

2. Saturation of soil by water which increases its weight.

3. Water pressure in cracks in the soil which tends to open them up and increase the horizontal stresses.

4. Weight of excavated soil and machinery on the ground surface adjacent to the cut.

5. Shock and vibration due to heavy machinery and blasting.

Decreases in soil strength may result from the following:

1. Prolonged stress, particularly tension. The soil slowly deforms plastically until it finally breaks.

2. Excess water pressure or upward flow in sandy soils.

3. The swelling of some clays due to water.

4. The drying out of damp cohesionless soils such as fine sands, which destroys their capillary forces and cohesion.

5. Breakdown of loose, unstable arrangements of soil grains.

● *Water Often Culprit.* "Most troubles in excavations are the result of a combination of these factors," Prof. Sowers said. "In some cases failure comes suddenly, in others, however, it develops slowly. In most instances water is a factor as might be expected from the number of different ways it influences both soil stresses and soil strength."

Failure prevention is basically simple, Prof. Sowers told members of the Construction Section. "Either prevent the increase in soil stress or prevent the decrease in soil strength. This cannot be done haphazardly. The first step is to determine the characteristics of the soil in question. This requires sampling the soil and then testing it to determine its physical characteristics.

"The second step," Prof. Sowers said, "is a study of the different factors which may be active in the excavation. Particular attention should be paid to sources of water, boh ground and surface water and any discontinuities.

"The third step is an analysis of the cut to determine its stability. In some cases it may stand unsupported. In other cases, corrective measures may be necessary to provide safety against failure."

Prof. Sowers said that most failures give some warning of what is to come. The first sign of trouble in the walls of the cut, he said, is the subsidence of the adjacent ground surface. Continuing subsidence is especially serious. The second sign, the speaker said, is the formation of tension cracks parallel to the trench. The last sign is the spalling of small pieces from the cut face.

"Bottom heave ordinarily occurs slowly and often goes unnoticed," Prof. Sowers said. "Subsidence of the ground surface adjacent to the excavation and removal of more soil than the apparent volume of the hole are both indicators of this form of trouble.

"A quick bottom condition ordinarily develops rather suddenly when water is pumped from an excavation. Occasionally small sand boils will appear at isolated points and give warning of instability. In other instances the bottom will heave slightly then turn into a boiling mass of quicksand."

Limiting the loads on the strip of ground adjacent to the excavation can help prevent a serious increase in soil stress, the speaker said. He suggested keeping excavated soil back from the edge a distance equal to at least the trench depth. Loaded trucks, he said, should be kept away from the trench as far as possible. Blasting should be avoided or charges kept light.

The most important stress correction method according to Prof. Sowers, is to relieve unbalanced stresses by bracing. He described several effective methods of bracing. In some instances, he said, a properly designed bracing system for a deep excavation requires as much steel as a small bridge.

The speaker also emphasized the importance of drainage to prevent decrease in soil strength, but he warned that drainage may be a mixed blessing under some conditions. He emphasized the fact that prolonged lowering of the water table can cause settlement of structures near an excavation.

A last method of preventing excavation failures, Prof. Sowers said, is to minimize the time between excavation and backfilling. While other factors often control the job schedule, he said, the danger of failure is reduced by shortening the time the excavation is open.

106,000 lin. feet of aluminum bridge rail

The 236-mile Kansas Turnpike, newest link in the nation's growing network of toll roads, presents many examples of applications of Alcoa aluminum. In addition to long lasting signs, mile-markers and traffic delineators, the use of aluminum here includes 106,000 feet of Alcoa bridge railing, Number 2004.

This railing has cast aluminum posts which support two 3½ in. diameter extruded tubular rails.

● Looking along the dividing "well" between typical paired overpass bridges; as seen along the Kansas Turnpike. (Roads and Streets staff photo.)

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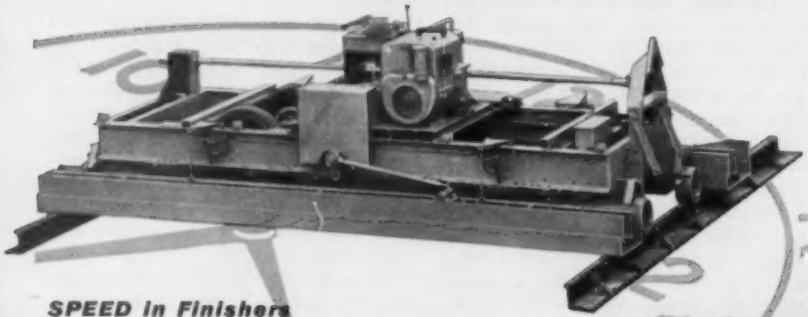

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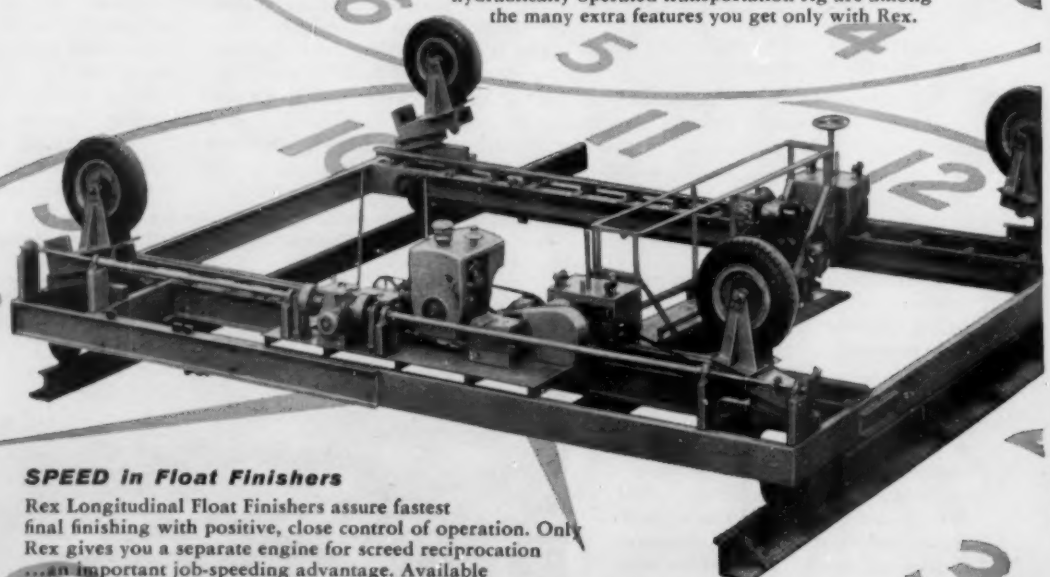
Rex Spreaders have extra speed that keeps them right on top of the paver. Powered-frame widening and hydraulically operated transportation rig are among the many extra features you get only with Rex.



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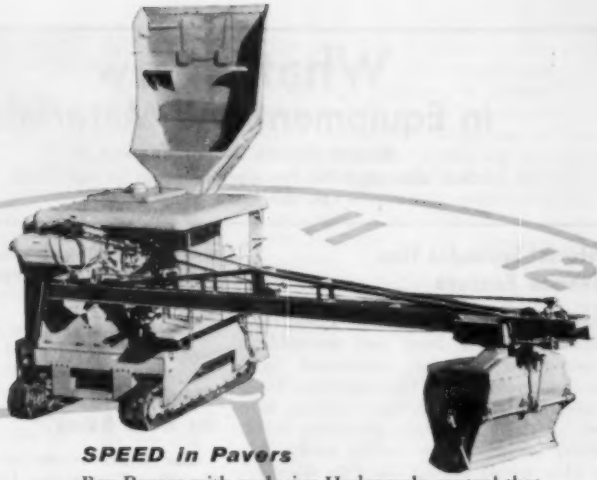

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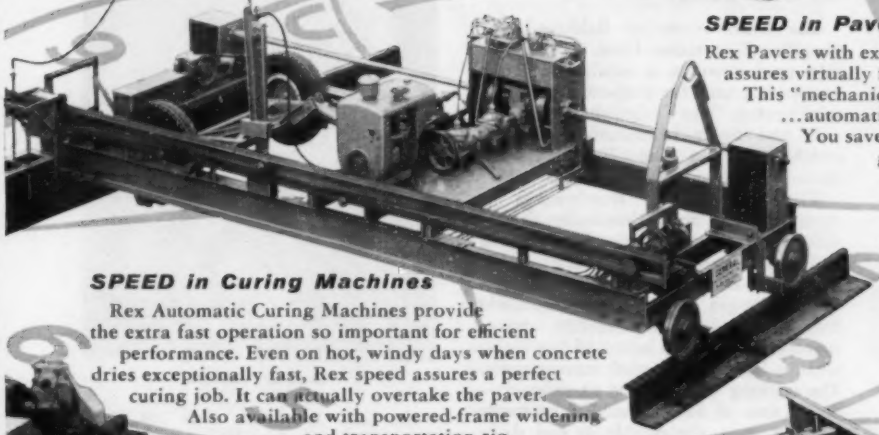

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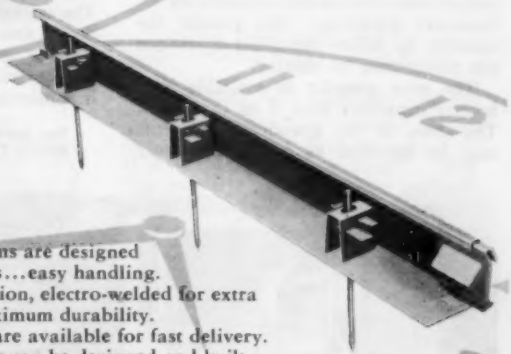

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PAVERS • SPREADERS • FINISHERS • FLOATS • CURING MACHINES • FORMS

CHAIN BELT COMPANY

MOTO-MIXERS • BUILDING MIXERS • PUMPCRETE • RAILPORTER • PUMPS

. . . for more details circle 266, page 16

What's New
in Equipment and Materials

Reader Service Coupon on Page 16
See also page 104 for equipment to be exhibited at the Road Show

Material Spreader Has Advance Feature

A new highway material spreader, called the Shunk front end reversible hopper type spreader, announced by Shunk Manufacturing Co., Bucyrus, O., permits sanding, cindering or salting in front of all four wheels, providing full traction for winter ice control work. It can also spread behind the rear wheels for sanding asphalt roads or spreading stone, chips, calcium chloride, agricultural lime and other materials. This feature is accomplished through unit-design construction whereby the hopper, conveyor and spinners can be reversed as a single unit on the truck chassis. Reversing the machine can be accomplished quickly and easily by two men using jacks or a block-and-tackle.

It is stated that the in-front-of-the-wheels spreading feature permits safe, high-speed operation up to 25-30 mph. under icy conditions.

Another feature is the visibility of spread when the machine is mounted for front-end spreading. This permits the operator to follow spreading operations yet concentrate on driving.

The new spreader is available with hopper capacities from 5 to 12 cu. yd. The drive to the spreader components may be specified as an independently mounted auxiliary gasoline engine or as a power take-off arrangement from the truck engine.

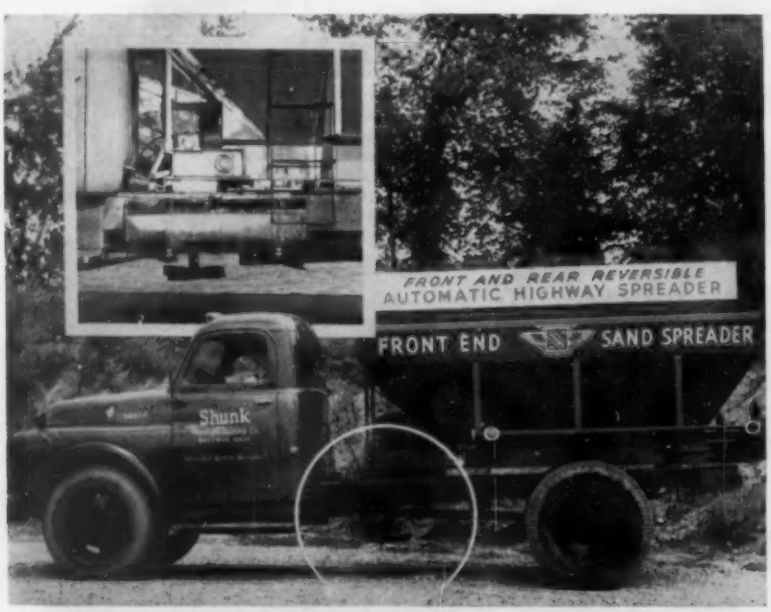
For more information circle 106 on Service Coupon Page 16 and mail now.

Compacting Unit for Road Bases

The Lima Works of Baldwin-Lima-Hamilton Corporation, Lima, O., has gone into production on a newly developed compacting unit for preparing bases for road paving. The design, drawings, patents and rights to manufacture were purchased from the Roadequipment Manufacturing Co., Wickliffe, O.

The self-propelled Roadpacker is equipped with six hydraulically driven, 420-lb. "shoes" which provide a tamping and vibrating action on macadam bases, gravel sub-bases and soil-cement bases. Its advantages are claimed to include flexibility and maneuverability, travel speed of 30 miles an hour and low maintenance because of sealed moving parts. The working width of the six shoes covers an area of 13-ft. 1-in. For narrower working areas, the outside or end shoes can be folded up under the frame in a few minutes' time.

For more information circle 107 on Service Coupon Page 16 and mail now.



Side view of Shunk Front and Rear Reversible Hopper-Type Spreader. Circled area shows unit mounted for front-end spreading and equipped with auxiliary gasoline engine. Inset shows close-up of spreader mechanism and drive.

Direct-Drive Chain Saw

A new direct-drive chain saw, D-44 for construction work, road clearing and park maintenance, has been announced by McCullock Motors Corporation, 6101 W. Century Blvd., Los Angeles 45, Calif.

D-44 features—many of them exclusive to McCulloch products—include quick, easy starting with rewind built-in starter, keyboard controls, chromeplated wrap-around handlebars, full-power operation in all positions, automatic clutch, high-capacity air cleaner, high-speed self-feeding chain, and a special-alloy bar with fortified, wear-resistant tip.

D-44 in Action

For more information circle 108 on Service Coupon Page 16 and mail now.

Time Saving Features for Tractors

A direction reverser that permits forward or backward travel at the same speed without shifting gears is the highlight of several new time-saving optional features for "420" crawler and utility tractors of John Deere Industrial Division, Moline, Ill. This is stated to be a real time-saving feature when dozing, digging, and handling loading operations, especially in tight quarters.

The easy-to-attach foot throttle, another new John Deere feature, is stated to increase engine and ground-travel

Direction Reverser Lever is Convenient to Operator and Is Easily Moved Forward or Rearward

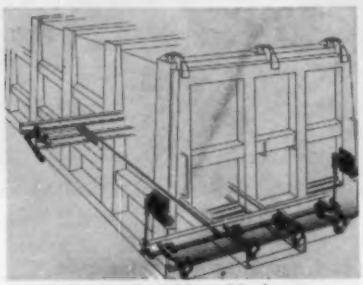
speeds up to 25 per cent, making possible travel speeds (with wheel-type tractors) up to 17 mph. on the highway. This is an optional attachment for "420" crawler and ultility tractors.

For increased versatility in many operations a 5-speed transmission is offered for all models of industrial tractors. The extra speed forward on "420" Utility Tractors is 6¾ mph. and on the Crawler, 3¾ mph. Regular forward speeds are: Utility 1¾, 3¾, 4¾, and 12 mph.; Crawler ¾, 2¾, 3, and 5¾ mph.

For more information circle 109 on Service Coupon Page 16 and mail now.

Tailgate Latching Mechanism

A new quick-opening lever-operated tailgate latching mechanism for Hydro E-Z PACK refuse collection bodies, announced by Hydro E-Z Pack Co., Galion, O., is designed to afford fast unloading of refuse at the dump. The new patented latching mechanism is controlled by a



Tailgate Latching Mechanism

folding hand lever located at the left side of the body, near the front. Movement of this lever releases six heavy-duty toggle locking latches at the tailgate and frees it for discharge of the load. The tailgate, hung on new offset hinges, closes completely when the body is emptied. Return of the latch hand lever to the closed position engages the six locking latches and locks the tailgate tightly closed. The control linkage snaps over center at each latch and at the hand lever bellcrank for double-safe latching.

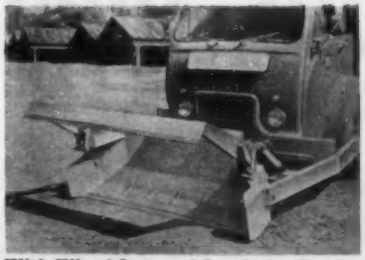
According to the manufacturer, the new latching mechanism maintains positive, watertight sealing of the tailgate at test packing pressures up to 25% over factory-recommended maximum pressure of 82,500 lb.

For more information circle 110 on Service Coupon Page 16 and mail now.

Retractable Wheel for Tandem Roller

A power hydraulic retractable wheel attachment for converting its new 3-5 ton tandem roller to a highly portable unit, has been announced by Huber-Warco Co., Marion, O.

Only three steps are required to change the Huber-Warco 3-5 ton tandem with retractable wheel attachment from its normal rolling position to a travel position for fast movement from job to job. A lock pin is removed and the towing hitch is placed over the pintle hook of the towing vehicle.



With Wheel Lowered Ready for Towing

The hydraulic control on the side of the machine is activated to lower the wheels and raise the guide roll end of the roller. A few turns of a shaft at each wheel locks wheels in position.

A second hydraulic lever on the side of the roller is activated to raise the drive roll end of the roller. The towing hitch lock pin is then replaced and the unit is ready to be towed to a new job.

The attachment can be either supplied already mounted on the Huber-Warco 3-5 ton tandem or it may be purchased later and be easily bolted in the field.

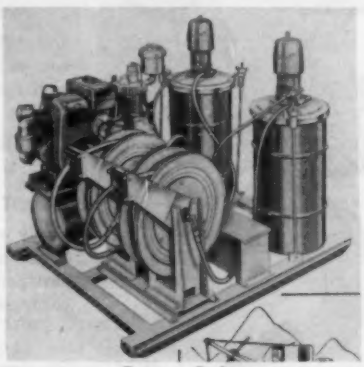
For more information circle 111 on Service Coupon Page 16 and mail now.

Portable Field Lubricator

A new, low cost, portable field lubricator designed to be carried in pick-up trucks or trailors has been announced by Gray Co., Inc., 1074A Sibley St., N.E., Minneapolis 13, Minn.

The new convoy luber is compact and lightweight and is claimed to be ideal for fast lube jobs, especially on equipment located at remote job sites.

This Graco unit is ready-to-operate, complete with two dispensing hose reels, high pressure and low pressure Fire-Ball pumps, 7.5 cfm. air compressor and tool box. The complete unit is mounted on a steel frame with hardwood skids for easy and fast loading on truck.



Convoy Luber

For more information circle 112 on Service Coupon Page 16 and mail now.

Traffic Warning Flasher Light

A new, improved traffic warning flasher light claimed to cost less than 1 cent a day to operate, has been introduced by the Gen-A-Matic Corporation, 14741 Bessemer St., Van Nuys, Calif.

The new light is stated to offer more than 25% greater light intensity and, with two standard batteries, to operate for a period as long as six months without battery replacement. Only one standard 6-volt battery is required for operation, but two batteries can be used for remote locations or where long operation without maintenance is desirable.

The light uses a newly developed alloy for contact points which is stated to reduce mechanical maintenance by giving longer battery life, longer point life and more positive contact.

New Gen-A-Matic Flasher Light

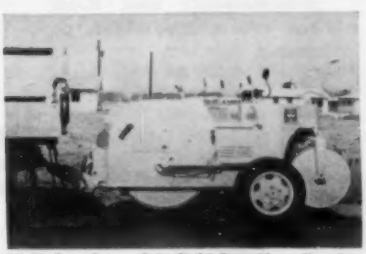
For more information circle 113 on Service Coupon Page 16 and mail now.

Loader Has Self-Loading Bucket

A new truck loader featuring a self-loading bucket has been announced by M-B Corporation, New Holstein, Wis. The new unit has a patented hydraulically operated jaw that swings down and reaches out to meet ground level approximately 13 in. forward of the lip of the bucket. The jaw smoothly completes its closing cycle by pulling in and holding the "full load" bite in the bucket.

The powerful jaw action of the self-loading bucket is stated to eliminate the necessity of ramming the truck into a stockpile to obtain a full bucket. When picking up small piles, the jaw is stated to fill the bucket quickly, easily and completely without "chasing" the material along the street and without using additional men to sweep or shovel into the bucket.

Two sets of hydraulic rams operating in unison provide full hydraulic power and



M-B Loader with Self-Loading Bucket

(Continued on page 179)

TREMENDOUS RIPPING TEAM

The tremendous power of the IH TD14, TD18 or TD24, plus the 10,000-pound Greenville tractor-mounted rock ripper shatter rock and packed earth for easy scraper loading. On many jobs explosives, shovels and trucks are eliminated.

Put this power-packed team to work for you. Your IH dealer can give you the facts. Let him show you how you can save as much as 25% on any earth or rock moving job.

LIVE SWIVEL ACTION

Shanks swivel 15° in either direction . . . follow tractor like a trailer. Points have live action that shatters rock like a jack hammer.

RUGGED POWERFUL SHANKS

Scientific contour gives extra strength at strain points and pulls points down deep . . . rocks roll out and clear of headframe. Made of tough, heat-treated, manganese-moly steel. Mount one, two or three shanks as needed.

POSITIVE CONTROL

Double-acting hydraulic system provides finger-tip control and puts full tractor weight on points for fast, deep penetration.

DRAWBAR TAKES PULL

The ATECO drawbar replaces the tractor drawbar and drawbar brackets. Clevis is accessible with ripper installed.

RIP AT ANY DEPTH

Easily adjusted to permit settings as deep as 24". Points are always at most desirable angle for best penetration and splitting action. Points are easily replaced.

WRITE FOR Greenville Bulletin IH-156. It gives complete data on the Greenville-Ateco ripper.

ATECO

GREENVILLE
STEEL CAR COMPANY
ATECO DIVISION
Greenville, Pennsylvania

. . . for more details circle 235, page 16

control throughout the entire cycle. They lift the arms up and beyond the vertical position, permitting the bucket to be stopped and dumped at any point over the truck body, providing even load distribution. Two hydraulic cylinders on the bucket operate the closing action of the jaw. Only two control levers are employed—one for the jaw, the other for the boom arms.

For more information circle 114 on Service Coupon Page 16 and mail now.

Wheel Winch for Loader

A new low cost wheel winch developed by Termac Dept. 2652, P.O. Box 556, Libertyville, Ill., is available for four-wheel drive bucket loaders. Operating from the loader controls the unit utilizes the ability of this type of loader to raise the front drive wheels and disconnect the rear drive axle. With the front wheels off the ground and powered, the wheel mounted winch rolls up the cable pulling the load toward the stationary vehicle. Weight transfer to the bucket cutting edge gives a positive anchor preventing the vehicle from being drawn to the load in the event the load is larger than the loader.

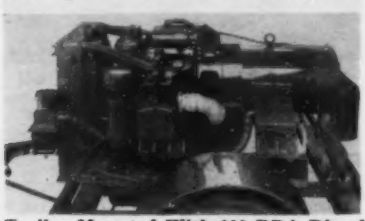
Wheel Winch on Loader

For more information circle 115 on Service Coupon Page 16 and mail now.

Diesel Engine—Generator Set

A portable, Wittee Model 100 RDA engine-generator unit, announced by Witte Engine Works Oil Well Supply Division, United States Steel Corporation, 1614 Oakland Ave., Kansas City, Mo., is designed to produce 12,000 watts continuously, 24-hours a day. A heavy-duty, industrial-type generator is direct connected to an 18 hp., water-cooled diesel engine.

Approximate overall dimensions are: length, 65 in.; height, 30 in.; and width, 39 in. Weight is 1,700 lb. The engine is a Witte Model 100 (100.5 cu. in. displacement). It has a 4 in. bore and a 4 in. stroke and operates the generator at 1,800 rpm. Engine speed of 2,400 rpm is permissible in certain applications. An inherently-regulated, 3-phase, 60-cycle generator is normally furnished. It is complete with a direct-connected exciter. The generator can also be furnished with separate voltage regulation, radio-suppression equipment, and otherwise in accordance with Armed Forces' requirements.



Trailer Mounted With 100 RDA Diesel Engine—Generator Unit

For more information circle 116 on Service Coupon Page 16 and mail now.

Portable Vacuum Drill Uses No Water

A compact, portable rotary drilling system weighing only 125 lb. which removes all cuttings from the hole by vacuum has been developed by Houston Tool Co., Santa Susana, Calif. Known as the Mighty Midget, the gasoline powered rig is easily carried by two men, facilitating use in rough terrain impossible to reach by truck or car. The unit is quick to set up and the rotary table can be swiveled to drill at any angle, vertical or horizontal.

High velocity air cools the bit and lifts the cuttings internally through the drill stem. Cuttings are separated from the exhaust and are deposited in a transparent glass container in the order removed, furnishing visible core samples easily correlated to depth.

The vacuum system requires no water. It also insures against loss of circulation in fissures or broken formations and eliminates any possibility of contaminating cores.

The Mighty Midget is stated to drill a 1¾-in. hole up to 100 ft. deep in dry formation and utilizes a 9 hp McCulloch engine.

Mighty Midget Drill, Insert Shows Glass Container for Cuttings

For more information circle 117 on Service Coupon Page 16 and mail now.

Semi Dump Trailer

A new frameless, front mount hoist, semi dump trailer has been introduced by Cook Bros. Equipment Co., 3334 San Fernando Road, Los Angeles 65, Calif.

The new semi trailer is called the "Starlift." It hauls a legal payload of 20 tons in most states and is claimed to offer new outstanding operational features of versatility, stability, durability and maneuverability. The "Starlift" eliminates the trailer frame, uses light-weight rugged steel, and combines with the new light-weight "safety first" hydraulic system, turns dead weight into extra payload.

"Stabilift" Semi Dump Trailer

Maximum stability is obtained with the Cook Bros. "tricucle" suspension and by the immobilization of the trailer springs during the final critical period of the dumping cycle.

An exclusive Cook Bros. feature is the "Lifeguard Channel Construction" of the Stabilift body to add to dump body durability. The semi dump trailer is braced all around the dump body by a welded steel channel placed mid-way up the body side.

For more information circle 118 on Service Coupon Page 16 and mail now.

Mobile Steam Generator

A new mobile 100 hp. steam generator, announced by Clayton Manufacturing Co., El Monte, Calif., offers prompt temporary steam service wherever needed. The mobile unit drives up to the desired location and flexible connections are made in a few minutes' time. Within as little as five minutes steam pressure up to 150 psig is available, with from 10 to 100 hp.

Clayton Steam Generator

For more information circle 119 on Service Coupon Page 16 and mail now.

Metal Powder Spray Unit

A new metal spray unit of improved design for applying hard-facing alloys and other metals in powder form is available from Wall Colmonoy Corporation, 19345 John R St., Detroit 3, Mich. The new unit features improved metal flow rates and increased deposit efficiency with no sacrifice in quality of the sprayed deposit.

Designated the Model C-2 Spray-welder, the new model is designed for use in applying hard-facing powders to

Model C-2 Spraywelder Mounting Panel

most types of steel (including stainless steel), cast iron and copper parts by the Sprayweld process. In this process, the powdered alloys are first applied by spraying and then are fusion-bonded to the part by heating with an oxy-acetylene flame.

Metal spraying operations using aluminum, zinc, copper, nickel, stainless steel, brass, lead or high temperature brazing alloys in powder form can also be readily handled by the new unit.

For more information circle 120 on Service Coupon Page 16 and mail now.

Rotary Drill

A new unit in its rotary drill line has been announced by Rotary Drill Division, Davey Compressor Co., Kent, O.

Designated as Model M-8AL, and equipped with a special long drill bar and mast, it is stated to drill 24-ft. ledges without changing steels.

Suitable for mounting on any standard truck, the unit utilizes both compressed air and high pressure water for drilling. It has a rated capacity of 6¾-in. holes up to 600 ft. with air and 1,500 ft. with mud.

Compressor for air blast drilling is a Davey 500 c.f.m. unit. High pressure water pump is heavy duty duplex type. Compressor and pump are driven by a BMC-471 engine mounted on the truck bed. A 5-speed transmission permits operation of the drill at its most efficient speed.

Davey Model M-8AL Rotary Drill

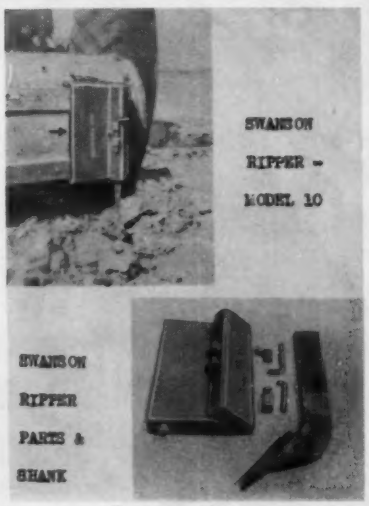
For more information circle 121 on Service Coupon Page 16 and mail now.

Ripper Rips Outside Grader Wheels

The Swanson Ripper, a new tool designed to cut the time and cost factor to

a considerable degree when it is necessary or advantageous to rip outside of the width of wheels or outside the cutting width of the blade of a motorgrader has been placed on the market by Swanson Mfg. Co., 515 63rd St., San Diego 14, Calif.

The Swanson Ripper is actually a specially designed attachment support boot which holds a standard make of ripper shank while the work is being performed. It is now being manufactured in two models for use with the No. 12 Caterpillar motorgrader. Both models can be used with equal effectiveness on either the right or left hand side of the machine by merely reversing the tool which is quickly and easily attached to the motorgrader moldboard frame.



Swanson Ripper

For more information circle 122 on Service Coupon Page 16 and mail now.

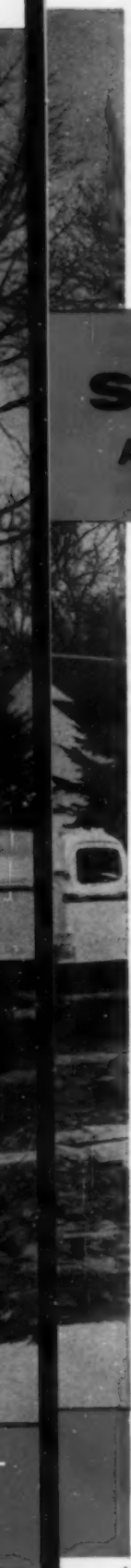
"Double-Duty" Dumpcrete Body

The Dumpcrete concrete carrying body of Manufacturer's Division, Maxon Construction Co., Inc. Dayton 1, O., has been redesigned for increased flexibility.

The new "Double-Duty body is stated to now meet the individual job requirements of contractors. It can be mounted on light, single-axle trucks to handle loads up to 4 cu. yd.—or on tandem-axle trucks to handle loads up to 6 cu. yd. Contractors can match their equipment to job requirements or mixing plant output, and can vary the Dumpcrete mounting from job to job.

New Design of Dumpcrete Body

For more information circle 123 on Service Coupon Page 16 and mail now.



Here's a brand new 1-yd. profit-maker for you—the Bucyrus-Erie **30-B**. Offered with either crawler or rubber-tired carrier mounting, it's readily convertible to various front ends — shovel, dragshovel, dragline, crane, or clamshell.

New . . . fast . . . quality-built, the **30-B** is just what you need in a 1-yd. machine to put you in a good position in the busy construction season ahead! Check the brief rundown of features given below; then request full details.

SEE IT AT THE ROAD SHOW!

Arena—space No. 514, corner 5th Avenue & U.S. 66

Matched to your needs

Either direct drive or torque converter drive — whichever best fills your requirements.

Five front ends, easily converted — main machinery arrangement simplifies conversion to shovel, dragshovel, crane, dragline, and clamshell to fit the job.

Your choice of five crawler mountings — standard length frames with either standard width or narrow width treads; long frames with narrow, standard, or wide treads; plus Transit Crane on rubber-tired carrier.

Extra equipment for special jobs — independent propel, third drum unit, cathead, telescoping boom stops, and various-length crane booms and jib extension.

Designed to out-perform

Easy, air control — hoist, crowd or drag, swing or propel, and steering clutches, as well as digging and swing brakes and dipper trip, are air controlled. Controls are accurate, conveniently placed, easy to operate.

Minimum time for servicing — easy access for maintenance, automatic lubrication of many parts; special system, with remote control located at operator's position, for greasing swing pinion and rack; grease fittings grouped to save time; adjustments quickly made, infrequently needed.

Strong, simple construction — parts are large, simple, few in number; provide strength needed for effective working, keep the machine on the job.

Built to outlast

Six conical hook rollers — two equalized pairs in front, two single in rear distribute loads evenly between upper and lower works, save wear.

Large, cool-running clutches and brakes — assure longer life. Five main operating clutches are alike, with parts interchangeable.

Specially processed steels add strength and wear resistance. Care in manufacturing pays off in extra years of machine life.

Strong, rigid cast steel revolving frame — built to withstand twisting and bending stresses — provides firm base for main machinery, maintains alignment to minimize wear.

THERE'S MORE—MUCH MORE ABOUT THE BUCYRUS-ERIE 30-B.

To get the full story, send the coupon in today or see your Bucyrus-Erie distributor. He has all the facts — will be glad to explain the 30-B's many outstanding features.

BUCYRUS-ERIE COMPANY

South Milwaukee, Wisconsin

send for complete facts

BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin

Gentlemen: Please send me details on the new 30-B.

Name _____

Organization _____

Address _____

City _____ State _____

198E56C

. . . for more details circle 217, page 16

Personals

CHARLES A. MCKEOGH has succeeded William H. Rhodes, retiring, as district engineer for the Asphalt Institute at New Orleans, Louisiana. McKeogh has served the Corps of Engineers for the past 13 years in the Texas area, where he was a leader in preparing the Flexible Pavement Construction Manual for the Corps' southwest division.

WILLLIAM H. MCALPINE, former special assistant to the Chief of Engineers, U. S. Army, and generally regarded as the dean of the civilian engineers in the Corps of Engineers, died recently at age 82. Mr. McAlpine, who lived at 4607 Connecticut Avenue, N.W., Washington, D.C., retired from the Corps in 1952 after 50 years of service with the Army Engineers. Because of his valued experience he had been retained on the Chief of Engineers' staff beyond the usual statutory retirement age of 70.

MURRAY D. SHAFFER, recently director of sales, Buffalo-Springfield Roller Company, is now associated with Shaffer, Parrott & Associates, consulting engineers of Mansfield and Wooster, Ohio. Shaffer was formerly director of public service and safety for the city of Mansfield, and in various capacities with the Ohio department of highways including that of director.

GEORGE E. WARREN, president of Southwestern Portland Cement Co., Los Angeles, is elected chairman of the board of directors of the Portland Cement Association. Mr. Warren has served on the board since 1953, and as a member of the executive committee for the past year. He succeeds Emory M. Ford, chairman of the Huron Portland Cement Co.

● **Newly elected and retiring chairmen of the board of the Portland Cement Association. George E. Warren (left), president of Southwestern Portland Cement Co., Los Angeles, receives congratulations of Emory M. Ford, chairman of Huron Portland Cement Co., of Detroit.**

ALBERT L. LOVE, JR., veteran Texas paving engineer, has been appointed district engineer for the Asphalt Institute at Santa Fe, New Mexico. Opening of this new office in the southwest division brings to 24 the number of the Institute's regional engineering centers.

ROBERT M. REINDOLLAR, immediate past president of the American Road Builders' Association, died after several months of illness in his home city of Baltimore. He was 62.

Mr. Reindollar, former chairman of the Maryland State Roads Commission and recipient of many professional honors, was widely known for his long-held, aggressive views favoring a national highway program. He led the battle for better highways during his ARBA presidency in 1953 and 1954. He was one of the first to advocate a $50 billion roadbuilding program in appearances before the Clay Committee at the White House, various committees of Congress, and numerous audiences throughout the country.

JAMES A. LINDSEY, JR. and ARCHIE N. CARTER have formed the new firm of Lindsey, Carter & Associates, Inc., Consulting Engineers and Land Surveyors, Excelsior, Minnesota. The firm which will specialize in planning and design of highways, drainage, municipal facilities, etc., is an outgrowth of the Lindsey Engineering Company of the same city. Lindsey's wide experience with the Minnesota highway department, Bureau of Reclamation, U.S. Navy and other agencies, will be augmented by that of Carter who, for the past 9 years, has been manager of the highway contractors' division of the Associated General Contractors, Washington, D.C.

Archie N. Carter

ARTHUR J. R. CURTIS, for many years in charge of the Accident Prevention Bureau of the Portland Cement Association until his retirement in 1952, died November 10 at the age of 69. Mr. Curtis was nationally known in industrial safety circles. For sixteen years he served as secretary of the Cement Section of the National Safety Council, and for many years was a member of the Council's executive committee.

FRANCIS V. DUPONT, former U.S. Commissioner of Public Roads, has become associated with two consulting engineering firms, Parsons, Brinckerhoff, Hall and Macdonald, of New York, N.Y., and Lockwood, Kessler and Bartlett, Inc., Syosset, N.Y.

The Parsons firm has been a leader in the field of toll roads, and has handled bridges, tunnels, harbor works and water supply developments. Lockwood, Kessler and Bartlett specializes in aerial surveys, seismic methods for subsurface studies, and

(Continued on page 186)

Personals

application of electronic computing to civil engineering problems. At present the firm is using electronic computation of earthwork quantities in the design of an Interstate Highway near Syracuse, N.Y.

Mr. duPont will serve each as consultant and member of its board of directors, maintaining his office at 1025 Connecticut Ave., Washington, D.C.

HOOPER, EVANS TO SMITH ASSOCIATES. Wilbur Smith and Associates have announced the association of Henry K. Evans and Curtis J. Hooper with the firm, and the opening of an office in San Francisco.

Mr. Hooper formerly was Director of Traffic-Planning-Design in the Connecticut state highway department. Prior to joining the Smith firm he was an associate in the firm of Parsons, Brinckerhoff, Hall and Macdonald.

Mr. Evans will be in charge of the San Francisco office. Prior to associating with Wilbur Smith and Associates, he was special assistant to the vice-president for operations, Pacific Intermountain Express Company. He was formerly highway transport specialist for the United States Chamber of Commerce.

Wilbur Smith and Associates have other offices in New Haven, Connecticut; Columbia, South Carolina; and Richmond, Virginia.

EARL F. KELLEY has retired after 21 years as Chief, Division of Tests and later of Physical Research, Bureau of Public Roads. Mr. Kelley who will make his home at 7009 Maple Avenue, Chevy Chase, Maryland, is a past chairman of the AASHO Committee on Bridges, its Subcommittee on Culvert Pipe and Drain Tile and a member of the Committee on Materials for a quarter century. As a leader in ASTM affairs he was a member of Committee A-1 on Steel, Committee C-4 on Clay Pipe, C-13 on Concrete Pipe (past chairman), C-15 on Manufactured Masonry Units, D-4 on Road and Paving Materials (past chairman).

Mr. Kelley is also a past president of the American Association of Paving Technologists, and has been active in the Highway Research Board and other organizations. His honors include the Roy W. Crum Award of the Highway Research Board (1956), Department of Commerce Gold Medal Award (1955) and ASTM Award of Merit (1954).

Parkway exemplifies interstate design goals

One of America's newest highways which comes close to meeting all the geometric standards of the Interstate System is the Garden State Parkway in New Jersey. Of this facility, Joseph Barnett of the Bureau said:

"The Parkway which was designed under the general supervision of Harold W. Giffin was planned, designed, and constructed in as short a time as any other comparable highway. Yet the result is extremely pleasing, the accident experience is low, and operation on this fully controlled-access highway is relaxing. The design was made by first obtaining aerial photographs and contour maps of the general location by photogrammetric methods and placing thereon a centerline for each one-way roadway, coordinating each line with its profile and sight distances ahead. These maps were then turned over to consulting engineers for the final design and the preparation of contract plans, specifications, and estimates.

"Long-tangent, roller-coaster profiles were avoided, yet the location is reasonably direct," noted Barnett.

D-A announces...

NEW TORQUE FLUID DEVELOPMENT

Another Important D-A First!

This all new D-A Type C Torque Fluid is the result of extensive laboratory research, thorough field testing and painstaking analysis of operating results. Already approved for all Allison Torqmatic Transmissions and Retarders, it is currently being field tested by other leading manufacturers. ***Only D-A Torque Fluid offers all these important advantages:***

1. *Seal Troubles Eliminated!*

Contains a *new* additive that preserves original resiliency of the synthetic rubber seals . . . prevents seal hardening, cracking and shrinkage . . . and controls seal swell to 0.2%. D-A Type C Torque Fluid *stops* fluid leakage.

2. *Varnish & Sludge Eliminated!*

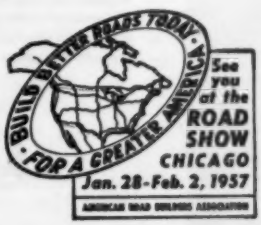
Contains a *new* type high-temperature oxidation inhibitor that prevents varnish and sludge formation on pumps, valves and blades — even at highest permissible operating temperatures.

3. *Usable Down to Minus 35° F.!*

Pour point of minus 35° F. assures adequate lubrication and maximum efficiency even at coldest winter temperatures.

These combined characteristics of D-A's new Type C Torque Fluid assure users of *less fluid consumption . . . longer converter and parts life . . . and efficient cold-weather operation!*

This new torque fluid is available *now* . . . in D-A warehouses across the nation. Contact your nearest D-A Representative for complete details.



. . . for more details circle 309, page 16

Operation
BATCHES SIMULTANEOUSLY

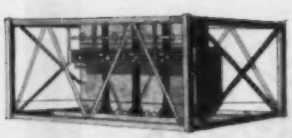
New BUTLER TX-4 Keeps Pace with FOUR 34E Dual Drum Pavers

Here's new engineered Automation so flexible, so fast, so dependable that it *obsoletes* all existing roadbuilders' plants. It's the new BUTLER TX-4 System, the modern batching plant that every contractor today *needs* to compete successfully. The contractor with only one paver starts with a TX-4 plant equipped with 2 batchers, and, as he expands with the road program, he simply adds additional batchers to the *same bins* to take care of 2, 3 or 4 pavers — and still retaining ONE-MAN OPERATION!

COARSE STONE

ONLY ONE OPERATOR

Builders Plant



Two or four-batcher units are shipped, handled, moved and stored with all piping and wiring in place.

How BUTLER TX-4 System fits Your Expansion Plans

THE BASIC UNIT

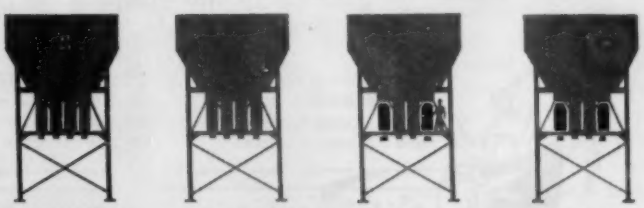
Handles one or two-batch trucks simultaneously

This Basic Plant, at minimum investment, provides facilities for batching for two-batch trucks — with one operator.

COARSE STONE FINE STONE CEMENT SAND

E-X-P-A-N-D-E-D UNIT

By merely adding extra batchers, at minimum extra cost, the Expanded Unit handles three or four pavers working at optimum production, charges 3- or 4-batch trucks



COARSE STONE FINE STONE CEMENT SAND

DUCTS

Write for FREE copy of this Bulletin giving complete details and specifications on every phase and feature of the new BUTLER TX-4 Road Building Systems.

BUTLER BIN CO. 959 Blackstone Avenue Waukesha, Wisconsin

. . . for more details circle 267, page 16

THIS IS THE FIRST PROJECT IN THE UNITED STATES

ON WHICH PAVING CONTRACT WAS AWARDED UNDER THE PROVISIONS OF THE NEW

FEDERAL HIGHWAY ACT OF 1956

MISSOURI STATE HIGHWAY COMMISSION

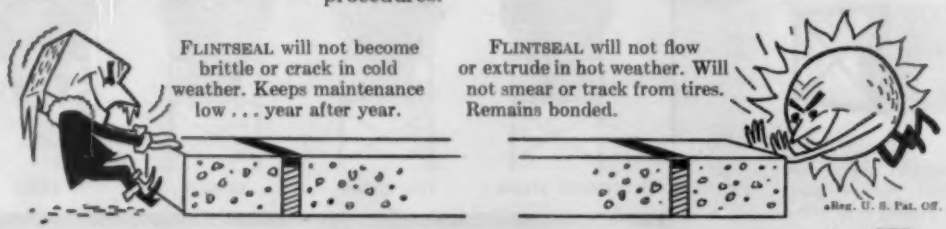
THE KOSS CONSTRUCTION COMPANY, DES MOINES, IOWA
CONTRACTOR

...and will use 47,000 pounds of FLINTSEAL

FLINTSEAL*. . . hot-poured rubber asphalt joint sealing compound for concrete pavements . . . gives lasting protection from leakage and *positive* sealing . . . during expansion and contraction cycles of pavement slabs. Meets Fed. Spec. SS-S-164.

Project I-89(7) & I-139(14) Laclede County, Mo., Awarded Aug. 2, 1956. FLINTSEAL supplied by Carter-Waters Corp., Kansas City, Mo.

Write for complete technical data and specification procedures.



*Reg. U. S. Pat. Off.

FLINTKOTE

THE FLINTKOTE COMPANY, Industrial Products Division, 30 Rockefeller Plaza, New York 20, N. Y.

. . . for more details circle 244, page 16

New Publications

CONCRETE CURING BIBLIOGRAPHY References on curing of concrete, 1925 to 1955, are compiled in Highway Research Board Bibliography 18, published by the Board at 2101 Constitution Avenue, Washington 25, D.C. Price $1.80. Compiled under the Board's Concrete Division, K. F. Wendt, Chairman, the Bibliography includes a comprehensive coverage of the literature from the United States and Canada, with a total of 518 references.

ESSENTIALS OF SOIL-CEMENT CONSTRUCTION. Seventh edition of a summary of latest techniques in a type of road construction which has grown rapidly over the past 20 years.

This 22-page booklet with illustrations contains chapters on soil characteristics, gradation requirements, etc., and the cement and water requirements; the all-important moisture-density test; steps in construction recommended for best results; and special construction problems in relation to soil-cement work.

For free copy, address nearest district office of the Portland Cement Association or its headquarters, 33 West Grand Avenue, Chicago 10, Illinois.

CONSTRUCTIONAL STEELWORK, by Oscar Faber. 134 illustrations. Price $12.00. Philosophical Library, Inc., 15 East 40th Street, New York 16, N. Y., U.S.A. A practical handbook based on standard specifications and codes of practice.

MIXES FOR HEAVY CONCRETES. By David L. Narver, Jr. Booklet reprinting article on proportioning of mixes for steel coarse aggregate and limonite and magnetite matrix heavy concretes; Volume 52 of American Concrete Institute. Available on request to Holmes and Narver, Inc., 828 South Figueroa Street, Los Angeles 17, California.

WHAT FREEWAYS MEAN TO YOUR CITY. A factual report based on the experience gained in a representative group of cities throughout the United States in freeway design, construction and operation. A highly readable and well pictured summary, of interest to civic leaders as well as municipal and highway officials and engineers.

Published in the public interest by Automotive Safety Foundation, 200 Ring Building, Washington 6, D. C. Copy available on request.

New Publications

HIGHWAY TRAFFIC ESTIMATION. The Eno Foundation for Highway Traffic Control, Saugatuck, Connecticut; written by Robert E. Schmidt and M. Earle Campbell, this 248 page book contains a wealth of hand book and reference material with chapters on land use, central business district problems, off-center commercial areas, off-center employment areas, traffic generation at terminals, traffic distribution in cities, and other subjects.

FOUNDATION ENGINEERING. By Rolt Hammond; price $10.00. Philosophical Library, Inc., 15 East 40th Street, New York 16, N. Y. Contains chapters on soil mechanics and site exploration, foundations for buildings, bridges and maritime structures and precision machinery; examples of difficult foundation problems and solutions; other subjects.

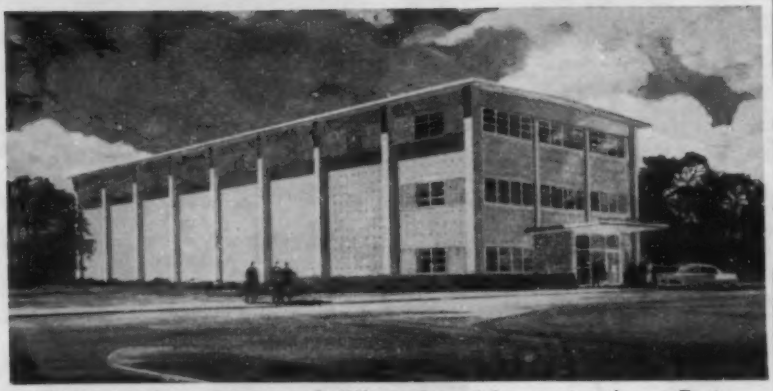
GENERAL LOCATION OF NATIONAL SYSTEM OF INTERSTATE HIGHWAYS. Data by states including additional routes at urban areas, as designated September, 1955. Includes numerous area maps. Prepared by the Bureau of Public Roads. Price 55 cents. Remitted to Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C.

New driver data needed

(Continued from page 157)

is years away, and that in the meantime existing roads must serve heavy volumes of traffic, was given by Mr. McMonagle. To keep present admittedly inadequate highways operating safely at maximum capacity, he said, requires an engineering contribution every bit as important and as essential as the roads now in the planning stage.

Mr. McMonagle pointed out that it is entirely probable that the new highway system of the future will never entirely replace many of the existing roads, but be superimposed. "Some of the roads in our present systems," said, 'will be retained indefinitely as service roads, supporting and complementing the expressway system and acting as feeders to the high service types. Others, serving lower volume requirements will not need replacement within the forseeable future. We have a tremendous investment in our present streets and highways, and it will be worth our while to protect this investment as every prudent man does in his own business operation."



● **Artist's drawings of two new buildings planned for construction at Portland Cement Association Research and Development Laboratories, Skokie, Illinois. Fire Research Center (top) will be 56 x 220 ft. Structural Development Laboratory (bottom) will be 56 x 176 ft. Both will be of "tilt-up" wall construction, with decorative designs cast into the concrete wall panel.**

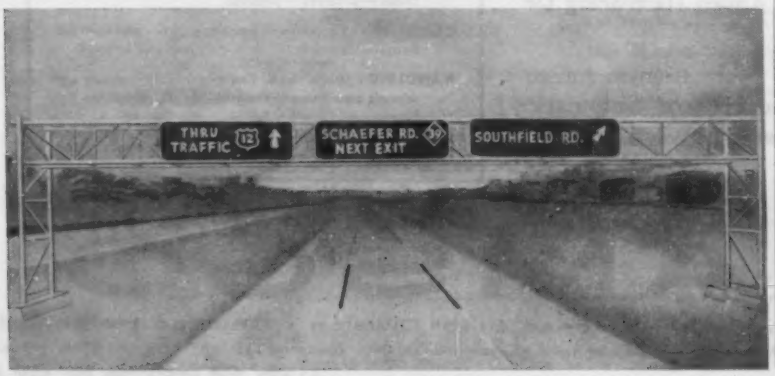
Cement Association adding to research facilities

The Portland Cement Association is expanding its Research and Development Laboratories at Skokie, Illinois, with the addition of two modern buildings, estimated to cost $2.7 million including equipment and grounds.

The buildings were designed specifically for PCA's special research needs by the architect firm of Dunlap and Esgar, Inc., in cooperation with the PCA staff. The buildings will house research and development work on concrete structures and on fire resistance of concrete.

New Aluminum Sign Bridges to Span Wide Expressways

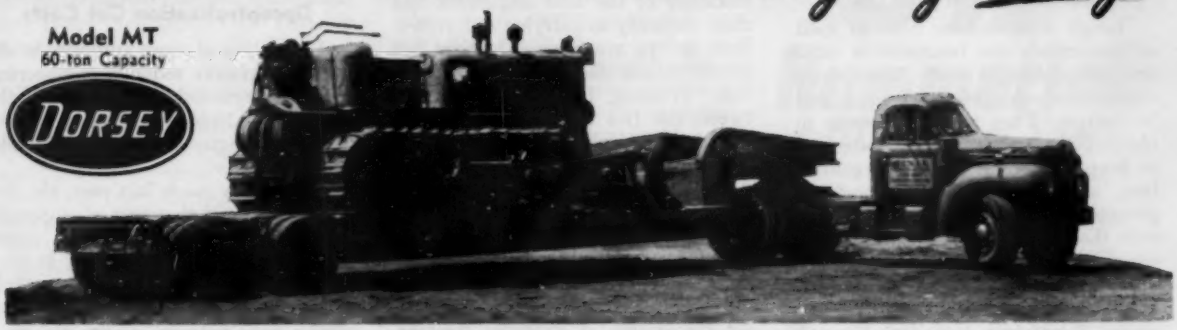
Here pictured by an artist is the design of the new all-aluminum overhead sign trusses which are being installed early in 1957 on the Ford and Lodge Expressways in Detroit. (See news report on some of the details, December Roads and Streets.) The light-weight Alcoa aluminum permits signs up to 40 ft. in width. The trusses, themselves, vary up to 100 ft. long.



500,000 miles.... and still going strong

Model MT
60-ton Capacity

DORSEY



After hauling construction equipment a distance equivalent to TWENTY TIMES AROUND THE WORLD this 60-ton-capacity Dorsey Model MT lowboy still performs dependably for Dixie Construction Co., of Savannah, Ga.
"Strength and low maintenance cost," according to O. J. Briston, Dixie shop foreman, are two of the many important features that make Dorseys superior.
We invite close scrutiny of all Dorsey specifications. Dimensions of main beams and all other structural members will convince any engineer that Dorseys are *built to "take it"!*
Dorsey standard specifications also include lights, brakes and other items needed for highway use and tires for each model are full-sized for capacity loads.

For every tough job, there's a tougher Dorsey

MODEL HTS

20 Ton capacity—Weighs Only 8,250 pounds (also available in 15, 25, 30 and 35 ton capacities)
Although as much as a ton lighter than other trailers of comparable capacity, high-tensile steel main channels and close-spaced all-welded cross members give the HTS superior strength and ruggedness. Flat gooseneck provides support for blades and other loads.

THE GIANT PLATFORM

44,000-lb. capacity—Weight: 8,410 pounds
In the year since its introduction, the Giant has become America's No. 1 platform! Although as much as 2,000 lbs. lighter than other platforms, it has even greater strength.

TANDEM TILT-TO-LOAD

15,000 and 20,000 capacities—Weights: 2,500 and 2,700 lbs.
Speed and efficiency as well as economy are combined in this versatile tilt model! It's so light a dump truck pulls it easily. Two-way hydraulic control is so precisely balanced the weight of a man will tilt it up or down. Single axle models also available.

NEW SELF LOADING FLOAT

This trailer will actually carry 45,000 pounds concentrated in 10 feet of its length! The secret is the extra-deep high tensile steel main frame that we "tailor" to length and load requirements!

DORSEY

DURING THE ROAD SHOW—
Be sure to see Dorsey's new lowboy with one-man removable gooseneck!
SEE US AT THE A.E.D. MEETING, TOO!

DORSEY TRAILERS / ELBA, ALABAMA

. . . for more details circle 273, page 16

How to Run a Highway Department

(Continued from page 144)

"Large organizations need to spell out concretely the functions of units and the duties of men. They need manuals which spell out policy and procedure. They need staff units to check on operations, to evaluate and to keep up-to-date policies, organization, and procedure, to report on progress against targets, and to provide those services on a central basis which are needed by all operating units to do their job.

"But those staff units need supervision. Supervisors frequently become dictators, they frequently emphasize conformity to procedure rather than to policy, and they frequently look upon their work as ends in themselves."

How Much Decentralization?

Solving the problem of relationships between the field offices and central office of the organization is a "must" in any state highway department," Mr. Mandell said. "The field offices generally want more information and more authority—they say they have to send in too many reports and that central office procedures hamper them in getting their job done. Central office executives criticize often the inefficiency of the field employees and their stupidity in carrying out policy. Both groups are frequently right but recriminations do not solve the problem. Training, frequent contact between the two groups, and spelling out of responsibilities are some of the major steps toward solution.

"Delegation of authority and decentralization, accompanied by adequate reports, are 'musts' in large-scale organizations. They are necessary to help people grow, to keep them interested in their jobs, and to get the benefit of multiple thinking and experience. Before any major policy is adopted, the opinions of those affected have to be obtained. In public organizations, however, a number of final decisions perhaps should not be delegated too far down.

"Because the states' business is the peoples' business, because of the many rights involved in purchases and rights of way and highway routes, a number of decisions delegative in private business have to be centralized. This results in a special need for an efficient central office which can make up in speed and wisdom for the centralization of what logically should be decentralized."

Decentralization Cut Costs

Delegation of more authority to division engineers reduced engineering costs and proved "extremely worthwhile" in Nebraska, Deputy State Highway Engineer Henry Schlitt told the conference.

In a survey made last year, the department found that cost of engineering varied widely among the states divisions—from 4% to 8½%. It was decided to delegate fuller responsibility to the division engineers. A few weeks ago, another survey revealed that the range of engineering costs has been reduced to from ¾% to 5½%.

"I believe that many of us have the erroneous impression that decentralization should only go down as far as the division engineer level. In practice, we know that responsibility may be even further delegated," Mr. Schlitt said. "Often, just as within our own headquarters, it is difficult to convince some division engineers that certain responsibilities can be delegated . . ."

I think the title of 'District Engi-

neer' is a misnomer. At least 50% of his work involves planning, supervising and coordinating the work of others. Why don't we call them what they really are—'District' or 'Division Manager'?

Recruiting Future Executives

Recruiting and training future executives was another phase of the manpower problem candidly appraised at the Cornell conference. Richard Johnson, training director for the Port of New York Authority, and Professor Earl Brooks of Cornell University, reminded the highway officials that the long-range highway program will suffer if men are not continually being prepared within the departments to assume high-level responsibilities.

"The purpose of management development is to help each executive to realize the best that is in him," Mr. Johnson said. "We do this by first determining his growth needs and then providing him with the controlled experiences—the climate—in which he can achieve the growth we both desire."

The wise chief official will see to it that his second and third lines of command are having all the possible opportunities for coaching, counseling, job rotation, refresher training, and research. This is particularly important to the industry in those states where many section heads are about ready for retirement.

There are many management activities in state highway departments which, if improved, would increase the departments' capacity to handle the new federal-aid work load. Roy E. Jorgenson, engineering counsel for the National Highway Users Conference, listed a few:

"Realignment of the departmental structure may be essential in some states. Some states have yet to develop their programs far enough in advance of construction to permit an orderly and an efficient carrying out of preliminary planning, design, rights of way acquisition, and scheduling of contract lettings. States which have been able to outline their work programs specifically well in advance of contract lettings, have reported tremendous value from improved efficiency in the department's operations.

"Essential to the promotion of efficiency, also, are the codification of standards, provision of adequate legal tools for rights of way acquisition, and effective working relationships with other governmental units. While meeting the challenge of the expanded program in the provision of plans, acquisition of rights of way and supervising of contracts may be viewed as the major immediate challenge to highway administrators, there are other important ones growing out of the present era of great interest and rapid expansion in the highway activities and the action of Congress."

Winter face shield

Contractors and highway equipment maintenance executives will be interested in the new type face shield developed for cold weather outdoor work by the Engineers' Research and Development Laboratories of the Corps of Engineers, at Fort Belvoir, Virginia.

Designed specifically for arctic conditions of cold and precipitation, where personnel are required to perform outside duties, notwithstanding the discomfort, the shield is scientifically designed to reduce the frosting over of glass and metal areas by moisture and condensation from breathing. The shield is adjustable for rotation from left to right to a 90° arc for a short period of time. A feature is a main shield and inner-frost apron of transparent "Plexiglass". The device was designed and patented by Kenneth L. Treiber of the Corps staff.

Portable Air Compressors

(Continued from page 161)

Thousands of man-hours are lost on construction jobs due to the failure of air receivers to work effectively. Air receivers should be kept clean by draining them periodically, except when the receiver is used as part of the oil recovery system in a rotary type portable unit. A safety valve, furnished for protection against excessive pressure should be checked regularly. Failure to do so will result in unnecessary maintenance expense.

The fuel tank, one of the most neglected parts of the unit, should be kept clean at all times and the tank kept full during cold weather when the unit is not in operation. This eliminates water condensing on the inside of the tank and working its way into the carburetion system.

● *Location Important.* Little consideration is usually given to the location of a compressor when pulling into a work site, but location is important. Compressors should be set in a level position and at a spot where the air is clean. If out-of-level operation is necessary, such as in pipe line construction, the manufacturer should be consulted on the out-of-level limitations of the machine.

Maintenance problems are often increased when a portable compressor is not transported from place to place properly. Compressors should not be towed at excessive speeds, as vibrations and excess wear and tear are bound to cause damage.

● *Storage.* Compressors should be stored under cover whenever possible. If stored for long periods at a time, the unit's cooling system should be drained. The lubricating oil should also be drained from the crankcase and a rust-inhibitor substituted. When filling the crankcase with the inhibitor, it is important to operate the unit long enough after filling to permit the rust-inhibiting oil to coat all moving parts. Oil should also be sprayed into the compressor intakes so that all valve parts become fully coated.

Neglect of the cooling system is a common practice which invariably leads to trouble. Care of the cooling system should be in compliance with instructions which all manufacturers furnish. If possible a good soft water should be used. General care corresponds much to that of an automobile and should not be neglected.

Like the cooling system, intake air filters of the compressor and engine are frequently neglected, as well as oil filters of the lubricating system. It is important to keep grit and other foreign matter away from working parts. All filters should be cleaned once a week under normally clean operating conditions.

Correct maintenance is important to the effective operation of the compressor at minimum cost to the operator. All too frequently, trouble arises as a result of the operator's negligence in complying with general instructions and failing to make regular 300-hour inspections of the entire mobile unit.

Montana's road system subject of study

A report entitled, "Moving Ahead on Montana's Highways" and a companion report, "Financing Modern Highways for Montana" have been published as the foundation for a long range improvement program for that state's roads.

The first report was an engineering and needs study prepared by the Automotive Safety Foundation for the Montana Fact Finding Committee on Highways, Streets and Bridges. The second report is a financial study prepared by Wm. L. Hall, Transportation Economist for the Fact Finding Committee.

. . . for more details circle 207, page 16

Here's a trench digger, backfiller, and compactor in one neat package, on a New Jersey water-company job. Truck arrangement provides transportation for men and tools. Compact 25 by 82 in. Le Roi 105 Utility compressor powers Le Roi-Cleveland breakers and tampers. Le Roi-Cleveland triple tamper in foreground features adjustable-height handle bar for greatest operating ease. It can replace five single tampers. Most important, when tamping, it stays close to the ground, making dangerous high lifts unnecessary.

Work-Saving Air-Tool Applications

by LE ROI

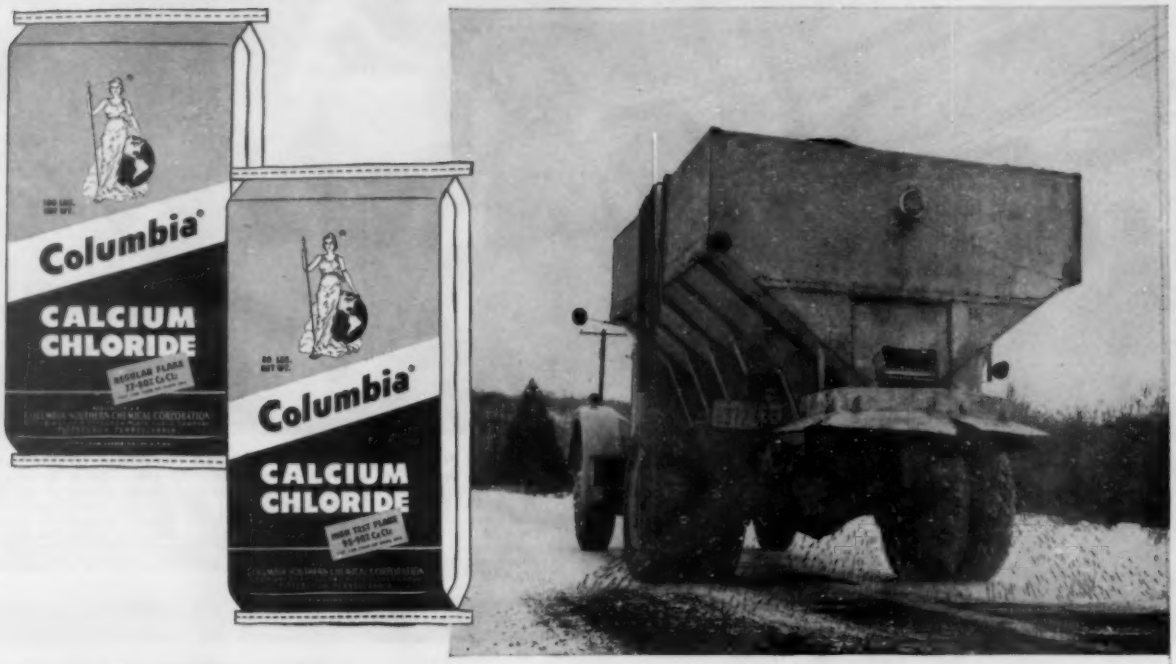
Highway construction in Mexico is frequently for the birds, or literally could be as this picture indicates. Two operators pictured on this treacherous perch rely on easy-handling Le Roi-Cleveland sinkers, as do 38 others on job. To complicate the fatigue problem, this area around Chilpancingo is often subject to extreme heat. Sealed dust-proof feature is one reason why these tools produce the powerful, constant rotation needed for fast drilling.

On this $1,600,000 Cleveland sewer job, Le Roi-Cleveland clay diggers set a daily 20-ft. pace. The C-10 clay spade was chosen because a great deal of handling and lifting were required. Operators appreciated a well-balanced tool for this rush job. The spade also is free from bumps, so that operators can get a firm grip and still work close to tunnel walls.

Gas company employee breaks through tough 12-in. concrete. To speed emergency repair work, this utility chose the maximum shattering impact of a Le Roi-Cleveland 52 paving breaker. Work speed, however, was only one consideration. Low-cost operation was important too. The 52's piston air-cushion reduces internal part wear, makes handling easier.

LE ROI Division of Westinghouse Air Brake Co., Milwaukee 1, Wisconsin, manufacturers of Cleveland air tools, Tractair, portable and stationary air compressors, and heavy-duty industrial engines. Write us for information on any of these products.

. . . for more details circle 264, page 16



Columbia Calcium Chloride is available in Regular Flake 77-80% $CaCl_2$ content and in High Test Flake 95-98%. One 80 lb. bag of High Test Flake is equal in calcium chloride content to a 100 lb. bag of Regular Flake.

Among the several cost-cutting advantages of using Columbia Calcium Chloride is the fact that a truckload of treated abrasives goes 3 times as far as a truckload of untreated. Treated abrasives anchor firmly; will not blow away.

COLUMBIA CALCIUM CHLORIDE
saves you money on ice control

Experience shows that abrasives treated with calcium chloride prove most economical and effective in safeguarding winter traffic on icy or snow-packed roads.

Stockpiles treated with Columbia Calcium Chloride will not freeze. Abrasives stay free and loose; *cut loading costs.*

Abrasives are easier to handle; *the cost of spreading is reduced.*

Abrasives treated with Columbia Calcium Chloride bite into the icy surface immediately and stay put; *they do not blow away.*

A truckload of treated abrasives stretches 3 times farther than untreated; *a tremendous saving.*

Aside from the big economies that result from using Columbia Calcium Chloride, your traffic benefits from safer driving made possible by skid-proof surfaces. The treated abrasives anchor themselves quickly and firmly in icy surfaces even at the lowest temperatures encountered.

Order your Columbia Calcium Chloride supplies now. Immediate delivery. Available in 100 lb. moisture proof bags Regular Flake; and in 80 lb. moisture proof bags High Test Flake. Both grades in bulk.

BUILD BETTER ROADS TODAY · FOR A GREATER AMERICA ·
See you at the ROAD SHOW CHICAGO Jan. 28-Feb. 2, 1957
AMERICAN ROAD BUILDERS ASSOCIATION

BOOTHS 61-62

Save money
and safeguard winter traffic
with Columbia Calcium Chloride

COLUMBIA-SOUTHERN CHEMICAL CORPORATION
SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY
ONE GATEWAY CENTER · PITTSBURGH 22 · PENNSYLVANIA

DISTRICT OFFICES: Cincinnati • Charlotte • Chicago • Cleveland • Boston New York • St. Louis • Minneapolis • New Orleans • Dallas • Houston Pittsburgh • Philadelphia • San Francisco

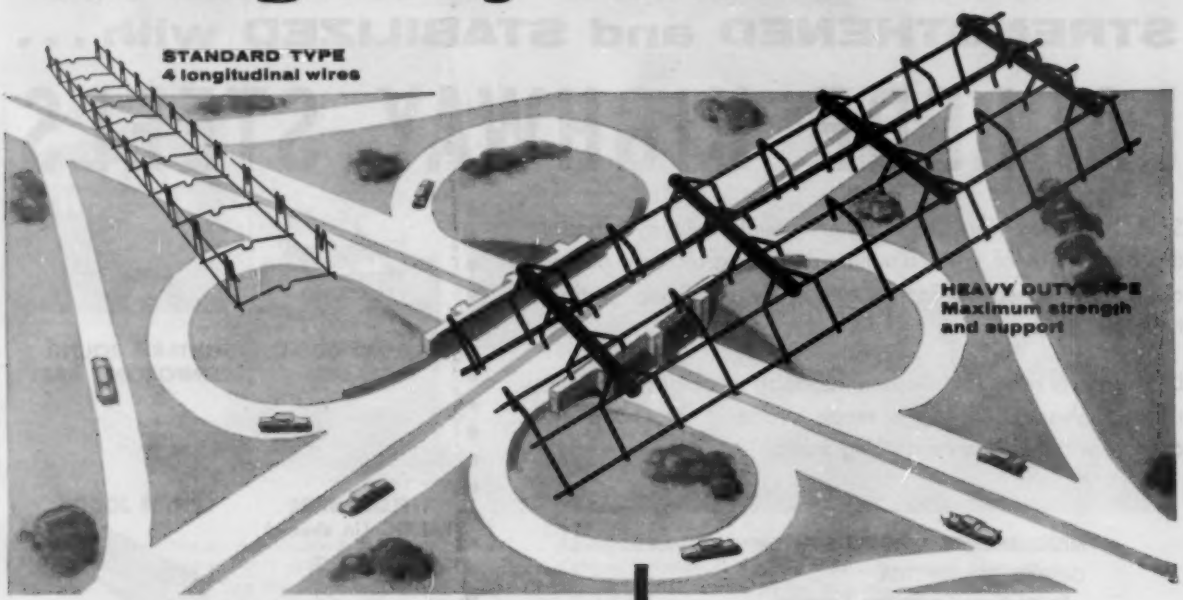
IN CANADA: Standard Chemical Limited and its Commercial Chemicals Division

. . . for more details circle 307, page 16

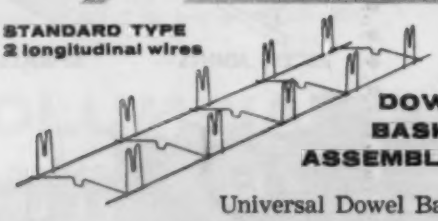
. . . for more details circle 264, page 16

. . . for more details circle 274, page 16

UNIVERSAL PRODUCTS
for highway construction



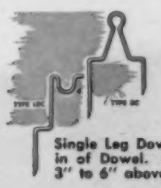
STANDARD TYPE
2 longitudinal wires



DOWEL BASKET ASSEMBLIES

Universal Dowel Basket Assemblies are designed and fabricated to specifications. Special equipment and fixtures guarantee accurate spacing and positive alignment of dowels. High speed production equipment and modern facilities insure prompt delivery of your requirements. Universal Baskets are approved by Federal, State and private authorities for highway and airport construction.

Let us quote on your requirements. Write for complete details today.



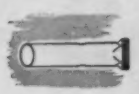
INDIVIDUAL DOWEL CHAIRS

Two-legged dowel chair holds dowel in 2 positions. Easily pushed into sub-grade—won't turn after installation. Wide range of heights.

Single Leg Dowel Chair permits quick snap-in of Dowel. Sizes to support Dowel from 3" to 6" above sub-grade.

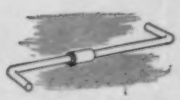
STAKE PINS

Keep Dowel Bar Assemblies in place during the pour. Lengths from 4" to 15" in ¼" increments.



DOWEL SLEEVES

Metal Dowel Sleeves for covering ¾" Dowel Bars; overall length covers 2½" or 3" Dowel. Special sizes and lengths available.



HOOK BOLT ASSEMBLY

For providing required tieing element along longitudinal joint. Eliminates necessity of bending tie bars or drilling road forms.

UNIVERSAL FORM CLAMP CO.

GENERAL OFFICES AND FACTORY: 1238 N. KOSTNER • CHICAGO 51, ILLINOIS

OFFICES AND WAREHOUSES:
CLEVELAND, OHIO, 24901 Lakeland Blvd. • BALTIMORE, MD., 1020 N. Kresson St.
HOUSTON, TEXAS, 2314 Preston Ave. • SAN LEANDRO, CALIF., 2051-9 Williams St.
LOS ANGELES, CALIF., 5855 South Western Ave. • ATLANTA, GA., 1401 Howell Mill Rd.
DISTRIBUTORS IN PRINCIPAL CITIES

Service Wherever You Build... Coast to Coast

. . . for more details circle 270, page 16

Bituminous ROADS AND STREETS

Medium-size, high production portable bituminous mix plant owned by C. L. Hubeer Co., of Denver, Colorado. Model 81 Pioneer (rated 60 to 80 cubic yards per hour), with GM Detroit Diesel trailer-mounted power unit.

Published by Gillette Publishing Company,
22 West Maple Street, Chicago 10, Illinois

Wyoming's Rubberized Asphalt Experiment
—One Year Later

Special Equipment on Widening-Resurfacing

JANUARY 1957

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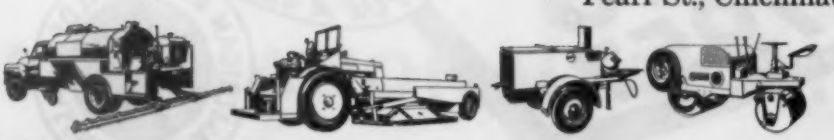

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. . . for more details circle 258, page 16

Wyoming's Rubberized Asphalt Experiment

—One Year Later

● Showing the tenacity of the rubberized cut-back used in the sealing experiment.

Results of an experiment which, to date, has shown definite superiority of rubberized asphalt over ordinary cut-back materials in retention of chips.

By F. B. Odasz and R. V. Witter

Husky Oil Company, Cody, Wyoming

THE November, 1955, issue of Roads and Streets described the first successful application of rubberized asphalt in the state of Wyoming. It was a seal coat application on a new one-mile stretch on Highway 14 just west of Cody. This was an experimental job under the supervision of the Wyoming state highway department. It can now be reported that these rubberized test sections, after one year of service, are living up to all performance expectations.

On this test an RC-3 cut-back was used with ⅜-in. chips. The rates of application were .25 gal. per sq. yd. and 20 lb. per sq. yd. respectively. One-half of the job used a normal RC-3; the other half used rubberized RC-3 produced by Husky Oil Company by the Benson Process, which was designated as RC-3D. The suffix "D" stands for ductility and is meant to distinguish the rubberized from the unrubberized cut-back by calling attention to its exceptional ductility characteristics. For example, at 39.2°F. the residue from the distillation of an unrubberized material is 8-12 cm., whereas the rubberized material will easily exceed the 150 cm. limit of the ductility machine.

The purpose of the experiment was to determine the economic advantages of using rubberized cut-back in comparison with normal cut-backs.

The pavement was divided into six areas. RC-3 and RC-3D were assigned to each area in such a manner that both materials would have equal traffic loads, even if the traffic on each side of the road was not equal. Furthermore, the method of assigning the material to the various sections attempted to equalize the effect of

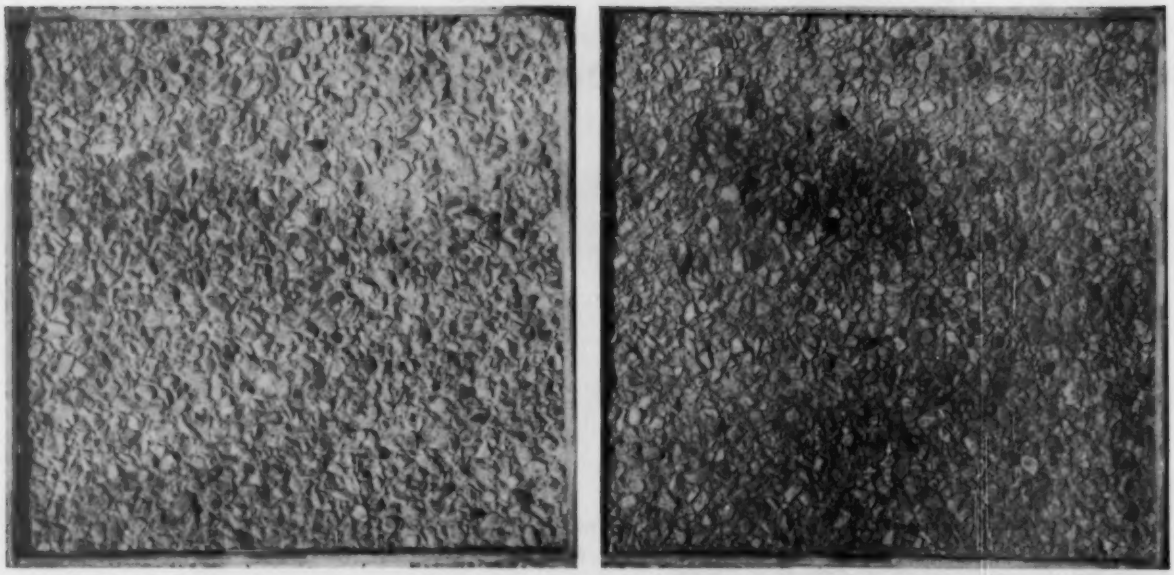
Table I

Number of Chips Lost Per Sq. Ft.

Position	Curved Area		Straight Area		Over-All Average
Materials Used	RC-3D	RC-3	RC-3D	RC-3	
Sept. 14, 1955	36	8	5	21	17.5
March 15, 1956	53	53	32	70	32
Sept. 7, 1956	107	112	34	80	83

Percentage of Surface Affected

Position	Curved Area		Straight Area	
Material Used	RC-3D	RC-3	RC-3D	RC-3
Sept. 14, 1955	5	0.3	2	1.7
March 15, 1956	10	4	4	8
Sept. 7, 1956	12	8	5	10



● **How the completed seal appeared one year after construction using RC-3D rubberized material. Surface condition on a curve shown at left, surface on tangent section at right.**

sun, wind, and snow conditions, and the shearing action resulting from the sliding of wheels around turns.

At four spots in the pavement (two in each of the two types of cut-backs) aluminum nails were driven into the pavement to delineate 1 ft. square areas permanently for close study. In addition, general observations were made from time to time to study any major changes that were occurring during the experiment.

● *Study Methods.* One of the methods used was to sweep up the excess chips which had been whipped off under traffic. Comparative weights of these chips were intended to be an indication of chip retention. However, dispersal of these chips by other construction work interfered with the reliability of this approach so it was abandoned.

The chip retention counts were extremely tedious to perform but in the last analysis they provided a good index for measuring changes in the surface of the pavement. It is important to remember that a valid comparison cannot be based solely upon the chip retention in a few randomly chosen areas. It is advisable to supplement this microscopic type of study with a broader microscopic study. Nevertheless, the photographs do provide a reliable means of studying the changes that occur in a particular small area.

Table I shows the change with time of the number of chips lost in one square foot of pavement and of the percentage of the area which is bared due to the loss in chips.

Table I shows that at the curved part of the experimental area the chip retention is considerably less than the over-all average chip loss of 83 chips lost per square foot. This is presumably due to the shearing action of the vehicle's tires as it rounds the turn. Moreover, the difference in chip retention between the two areas on the curve is so small that it appears that there is no appreciable difference due to the rubber content under these conditions. Nevertheless, the RC-3 has lost 5% more of its chips than the RC-3D.

Chip Retention

The greatest difference in chip retention occurred on the straightway part of the experimental pavement. Both the rubberized and unrubberized sections show less loss than the overall average, but the unrubberized section lost 2.35 times as many chips as the rubberized section under substantially the same conditions.

● *Holding Tenacity.* One of the important factors that this experiment was designed to measure was the length of time that the rubberized asphalt would retain the extreme tenacity shown in the accompanying photo, taken at the time of the original construction. There have been some reports that certain rubbers deteriorate under the influence of weathering conditions, due possibly to the effect of atmospheric ozone on the rubber. After one year of weathering, RC-3D has not lost its tenacity and ductility. The chips on the rubberized side are harder to dig out with a knife blade, and fine strands of rubberized asphalt still string out between the pavement and the chip.

The Wyoming state highway department has also been carefully observing the results of their first experiment with rubberized material. The reaction is favorable. In the words of the project engineer, William F. Loeper, "The differences are just beginning to show up. The rubberized asphalt is living up to all our expectations."

Like other highway departments in the nation, the Wyoming department is keenly aware of the accelerated construction schedules which it will face as a result of the new federal highway construction program—the greatest in the history of man. As a consequence, it is felt that, inasmuch as the cost of road oil is a relatively small part of a seal coat, the use of a superior material which will do a better job and allow longer periods between maintenance jobs can readily justify its added expense. A 20% longer life is considered the break-even point. Thus far the evidence is that some rubberized materials can surpass this criterion. Based on the chip retention count, Wyoming's experiment shows an average improvement in chip retention of 36% after only one year of service. The tougher, more tenacious material with its improved low temperature ductility has

(Continued on page 221)

VIEWS AND COMMENTS

By H. G. Nevitt

Pavement Hardening from Volatile Loss

Part I. Fundamentals

IN PREVIOUS issues we have discussed asphalt hardening from loss of volatiles; have demonstrated that it is really a two-fold problem, and have given our ideas on the first phase, namely: the control of asphalt volatiles from the standpoint of mixing or construction. We now offer a corresponding analysis and suggested solutions for the control of hardening during the use of the pavement.

Relatively speaking, hardening during construction presents a simple situation and solution; road hardening presents far greater difficulties due to added complexities in the effective variables requiring consideration and their evaluation. At the best—and even with far more knowledge than we possess today—the solution will not have the clarity and simplicity that we would like. But some control of this hardening is possible, and data showing the need for such are widely appearing. The paper in the 1956 Proceedings of the Association of Asphalt Paving Technologists by Clark of New Mexico, on the experience of that state, typifies the problem and need. We hope in this discussion to forward the analysis and perhaps make some constructive suggestions concerning a solution.

This series has been primarily concerned with the control of volatiles and properly, since most of the hardening results from the loss of the lighter fractions of the asphalt. It is true that the other two basic factors causing change in the asphalt (oxidation and polymerization) likewise tend to produce a harder binder. However, the loss in penetration resulting from them is less marked than from volatile loss, and also less deleterious than the other changes they produce in the asphalt. We can therefore justify the attempt to consider them (in a partial way) separately; at least we can say that the loss of light components is primarily correlated with, and controlled by, the change in consistency, while the effect of these other factors results from basic changes in the nature of the binder, such as (perhaps) its ductility characteristics.

And it can be added that the merit of any suggested controls will not be lost if the consistency change measured happens to result in some degree from these other factors, rather than volatile loss. However, we will occasionally consider these agencies in order to maintain a balanced viewpoint of the hardening phenomenon.

To survey the situation properly and evaluate its possibilities, it seems best to consider and weigh the effects of the variables which influence binder hardening. They fall into three groups —the asphalt properties, the aggregate properties, and the exposure conditions.

Effect of Asphalt Properties

The asphalt properties can be divided into two groups, physical and chemical. The division is a rough one, at least in theory; some changes are difficult to classify (such as colloidal agglomeration versus polymerization) and changes in one property influence those in others. In practise we do not need to be ultra-scientific, since the physical trends of interest are volatilization, absorption, and adsorption, while chemical change due to either oxidation or polymerization (or, most likely, the two together) is the other primary variable.

• The physical changes named are mainly dependent upon the character of the lighter fractions left in the asphalt after mixing. Any really volatile material will cause a loss in penetration by evaporation. Absorption effects are similarly determined by the boiling range (hence viscosity and other properties) of the oil fraction of the binder. However the range of fractions absorbed is probably much broader; and it is unlikely that asphalts of normal functioning characteristics can be obtained which, with certain aggregates, may not harden by differential absorption even though they show extremely low volatile loss.

Adsorption effects are less easy to estimate but probably follow, from at least the standpoint of practical results, the trend for absorption. We can then say that hardening will be determined by the lower boiling fractions of the asphalt, with the amount these fractions cause influenced by the nature of the aggregate and the exposure conditions.

As previously noted, the chemical changes—that is, oxidation and other changes in the nature of the asphalt—are less measurable by the hardening (particularly if expressed in terms of penetration) than by effects on other properties. While all hardening will include some contribution from these other effects, we can then separate and evaluate the cases of normal and/or volatile hardening. This is done by eliminating from our observations these examples where the changes in these other properties indicate that chemical effects are contributing more than normally to the deterioration. We might do this by comparing the reduction in ductility noted in field hardening (or in the laboratory simulation thereof) with that determined on the asphalt sample previous to weathering exposure, through a distillation reduction to the same penetration in which chemical changes were minimized or eliminated.

We should not be interpreted as saying that asphalts showing such chemical changes are ipso facto inferior and to be eliminated—such is a matter for additional study. It is simply that their effects, and the control thereof, can be separated from the consideration and control of the more common hardening process due primarily to loss of the lighter fractions of the binder.

• Our greatest problem with chemical changes is to know at what point they become important. It is known that hardening causes failure; it is not known whether the limiting (or lowest) penetration at which this is likely to occur is the same for hardening by chemical action as from volatile loss. We strongly suspect that a pavement, the binder of which has hardened to twenty penetration but with the ductility still above one hundred, will

give superior service to one with a binder of forty penetration which nevertheless shows a negligible ductility. With chemical changes, hardening is perhaps far from the whole story.

Effect of Aggregate Properties

In the mixing operation the aggregate properties do not have a great effect—except possibly on the mixing time, in which research not yet carried out might show wetting effects should require appreciable adjustment for certain aggregates. The gradation probably will not change too much the area exposed; and while appreciable total absorption due to the low asphalt viscosity at mixing temperatures will take place with aggregates of this type—and correspondingly increase the need for asphalt—the time is too short for much differential absorption or activities other than volatile loss which cause hardening to occur. In the weathering period, the situation is quite different; the aggregate can, and frequently does, exert appreciable effects. These must be recognized and considered.

The rate of evaporation loss of any volatile fractions is determined by the aggregate gradation—not so much as this effects the area but rather the air voids and particularly their average pore diameter. If the pavements voids are large, there is area exposed to evaporation; if the mean pore diameter of these voids is also sufficiently large, the pavement will "breathe" with temperature changes, meaning a rapid removal of the evaporated volatiles.

If, however, the pore diameters are so minute that air circulation is negligible, the presence of void spaces will not be important, and the rate of volatile loss will be set mainly by the much slower diffusion process. This effect is sure even if slow, so such volatiles will be eventually lost. However, two practical considerations might wisely be interpolated at this point. The first is that this diffusion process can be slowed down or even reversed by periodic seal coats of the proper design. The second is that the diffusion loss is constant per unit area of pavement, hence thicker pavements are proportionately slower to harden from this volatile loss.

• The surface characteristics of the aggregate may also affect the hardening. Of its effects, differential absorption of the lighter asphalt fractions is usually the only one of importance. This phenomenon is probably an important factor in the curing of cutbacks with many aggregates; and the same action (in lesser degree, and far more slowly) tends to remove the lighter oils from the binder. While the speed of the removal changes appreciably with the boiling point of the oils removed, it varies from volatilization losses in that it probably occurs with fractions that would not be lost in appreciable amounts by the latter effect.

Therefore, a loss test may not serve as an adequate measure of the tendency for this type of hardening to develop. Since this particular action is probably an important one, it is unfortunate that real data on it is not available; it is one of the fields of study in which there is much work to be done.

Incidentally, present methods of evaluating hardening may not always, or at least completely, bring out this effect. The solvent which removes the asphalt film from the aggregate tends also to bring the absorbed oils back out of the pores of the aggregate. Continuation of the work done years ago by Benson in Kansas, where removal by detergents was compared with that by solvents, may throw more light on this point. Otherwise, structural tests to bring out hardening—and effectively integrating the results of all the hardening effects present—may prove to be the best approach for its measurement. It would also bring out the other absorption effect—the continued movement of the entire asphalt present into the aggregate pores, resulting in a leaner and hence more brittle mix.

As previously noted, the other aggregate effects of adsorption, and as a catalyst promoting both polymerization and oxidation, probably have no practical significance. At least, while we know they may exist and cannot be ignored in research studies, there is no available data to indicate they must yet be considered in practical construction.

• An indirect influence of the aggregate deserves mentioning. This is the effect of the gradation—more specifically, of the content of fine fractions—on the minimum penetration or maximum consistency that can be tolerated. Thin films must be offset by softer asphalt, whether the result of a lean mix or the presence of fines. Lean mixes are preventable by proper design, but a high content of fines may have occasional justification for one or more reasons; and where this is the case it tends to influence the point at which hardening causes difficulties.

The conditions occurring during the design life of the pavement greatly influence the changes that may occur in any given mixture of aggregate and asphalt. The predominant factor is temperature. The influence (directly on the pavement layer) of water in its various manifestations is important only when the porosity of the finished pavement is sufficient to permit appreciable movement of water in and out.

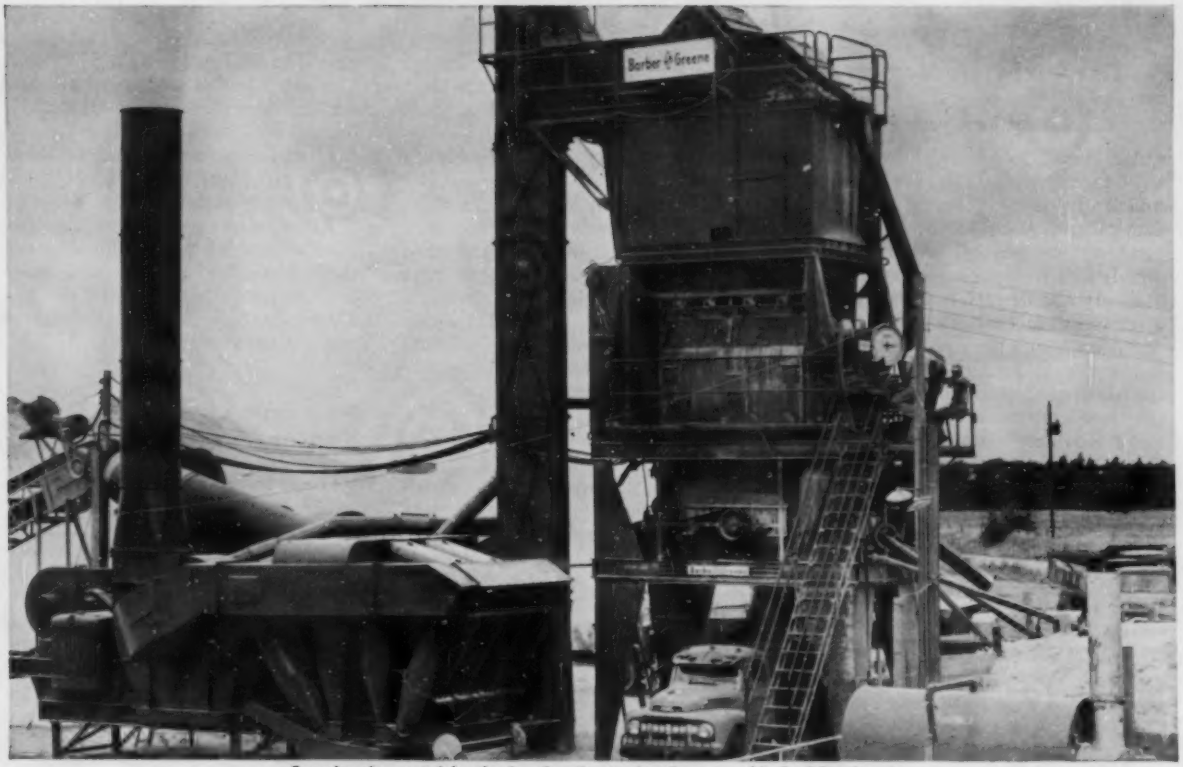
The influence of temperature on chemical changes such as oxidation results from the fact that the rate of most chemical reactions doubles with each eighteen degrees Fahrenheit increase in temperature. This means that the speed of normal atmospheric oxidation at 140° may be something like sixteen times the rate at 68°. Evaporation or absorption of volatiles does not follow the same rule, but these increases are in the same order of magnitude so that here again temperature exerts a remarkable effect. To our knowledge little cognizance has been taken of this fact in either design or life predictions.

Normal Atmospheric Oxidation

The term "normal atmospheric oxidation" should be carefully noted. The above rule only holds in the range of temperature in which the reaction takes place; changing the temperature appreciably may have a different effect, in that it may go beyond merely speeding up the rate of a certain reaction and in addition (or in substitution thereof) start others. Asphalts furnish an excellent example of this situation. The evidence to date indicates that the oxidation reactions occurring at high temperatures—such as in hot mix plant operations or in commercial asphalt oxidizing — are quite different than those occurring in the atmospheric temperature range. Hence test carried on at such elevated temperatures cannot be safely used to predict atmospheric temperature changes. And, while the picture is not quite the same for volatilization, the differences that do exist plus the influence that chemical and physical changes have on each other make it almost as undesirable to resort to high temperatures for accelerated tests to predict weathering (as distinguished from mixing) volatile loss.

As indicated above, the presence of water, while an appreciable indirect factor through its effects on the structure below the mat, should not ordinarily affect the pavement hardening since we have no evidence that water in vapor form influences it. In most designs the capillaries constituted by the voids are too small for liquid

(Continued on page 214)



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. . . for more details circle 216, page 16

Pavement Hardening

(Continued from page 212)

water to enter, or at least do so with any rapidity. Where the mat is sufficiently open to permit its entry, damage can result. This is generally greatest through its effects on the foundation; freezing and thawing are in theory also threats, but we question whether this factor has in practice real significance with the pavement proper. But water in contact with the thin asphalt films throughout the pavement can accelerate the hardening. The water carries dissolved oxygen, and that from below the mat dissolved chemicals; the two in combination can rapidly accelerate hardening, as we have observed in irrigated areas. It is obviously difficult to predict hardening from this source, and if open mats are built, special attention to local conditions, rather than general rules, is in order.

It will be noted that sunlight (except through the temperature increase it causes) is not listed as a cause of hardening, although frequently mentioned as such in the literature. The reasons for this are both theory and practice. Undoubtedly, asphalts are affected by long exposure to light, but the bonding films of the pavement get no such exposure. Any pavement surface effects are not sufficiently deep to matter, probably cause deterioration no faster than erosion, with both effects compensated for by routine maintenance seal coating. Practical observation bears this out. Asphalts which have been rejected for other uses due to pronounced light instability have nevertheless shown up quite well in highway use. Any weathering technique which accentuates light (rather than heat) effects does not simulate ordinary pavement exposure.

• Summing up, it is evident that hardening may be the result of, or influenced by, many factors—the nature of the asphalt, of the aggregate, or of the conditions of exposure. Is there a practical way to control the materials and design to avoid unwarranted hardening? We believe there is, and will discuss the problem from this standpoint, along with its solution, in a later issue.

Stabilizing shoulders with emulsified asphalt

To cut maintenance and provide greater safety the Oregon state highway department is using a new procedure for stabilizing shoulders. In place of removing the existing shoulder material and putting in a new oil mat, the material is treated with a mixing grade of emulsified asphalt, followed by an emulsion seal. The result is a satisfactory shoulder at lower cost.

As described in Western Construction, the relatively new procedure stabilizes the existing material at a saving of as much as $1,500 per mile, compared to replacing it with a stabilized oil mat. An SS-1 (mixing grade) asphalt emulsion was selected because of its ability to mix readily with wet aggregates, plus its ease of handling.

Steps in the procedure were adjusted to meet varying conditions, but usually began by sprinkling the shoulder with water to hold the fines. Next step was to grade the material away from the pavement to a depth of about 1 in. Emulsified asphalt was then added in several shots, sometimes diluted with about 50 percent of water. The water helped disperse the emulsion.

The applications continued until about from $.65 to 0.80 gal. per sq. yd. of emulsion had been blended in. It was aided in dispersal by occasional blading. Then, the finish grader was equipped with a layout "boot" designed to give a straight shoulder line to the surface. It made the final layout pass, followed with a steel-wheel roller. A final light shot of mixing grade emulsion was applied and the surface covered with coarse sand.

Curing for 7 to 10 days was allowed before the final seal consisting of 0.25 gal. of R,S-2 quick-breaking emulsion covered with ¼-in. to No. 10 oil aggregate. The final seal was drag-broomed. The two types of seal aggregate used established excellent demarkation of the shoulder from traffic lane.

After the procedure and to standardize procedure, maintenance crews were able to stabilize about 1¾ miles of 8-ft. shoulder per day. Average cost for stabilization with emulsions was about $2,000 for the two 8-ft. shoulders per mile. This compared to about $3,500 per mile for conventional oil mat construction.

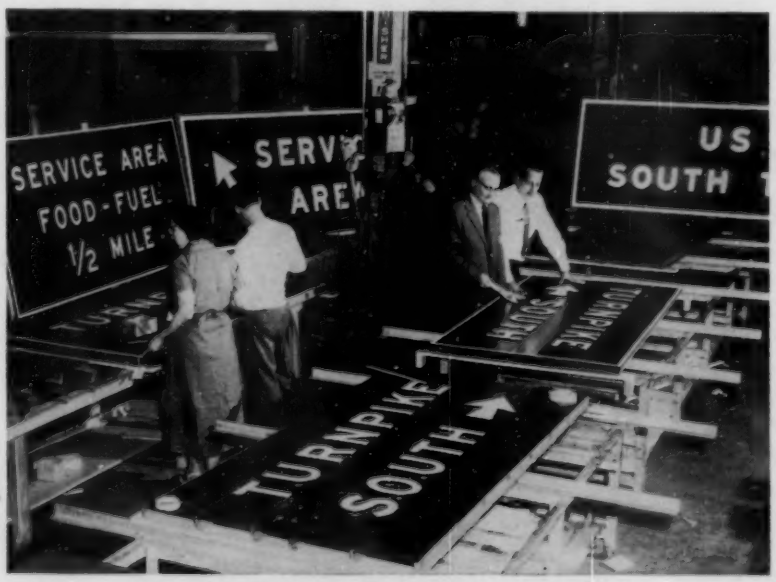
New type signs for Kansas Turnpike

Procelainized aluminum extrusions and raised reflective lettering have been combined for the first time, in an effort to increase the life expectancy of highway signs on the new Kansas Turnpike.

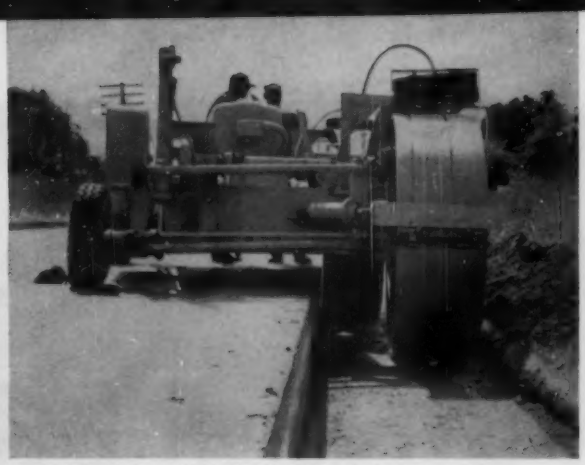
Whereas ordinary highway signs must be refinished or replaced every five to eight years, the Kansas Turnpike signs, installed by Federal Sign and Signal Corporation are expected to last for as long as 15 years without recoating. The turnpike sign program involves $400,000 worth of highway signs and markers.

Approximately 1,500 of the dark green porcelain signs will guide motorists along the 236-mile Kansas Turnpike, recently opened to traffic.

A safety provision on the turnpike will be 30,000 "cat's eye" delineators placed in four continuous lines. The delineators will be amber-colored at interchanges and services areas; clear crystal elsewhere.



• **Some of the 1,500 new Federal signs designed for the turnpike, marking the first time porcelainized aluminum and raised lettering have been combined on highway signs.**



● For the Ohio Route 7 widening, the contractor used this new Blaw-Knox DTR-552 dual-drum trench roller.

New Special Equipment Used on Widening-Resurfacing Job

ROAD widening was in progress late in 1956 at a dozen locations in the booming industrial area along the West Virginia and Ohio banks of the upper Ohio River. Much of the work, which combined both widening and straightening, made use of special equipment developed since the War by manufacturers to expedite this type of project.

On Route 7, winding down the Ohio side of the river, construction work was dotted all along the route from Wheeling to Gallipolis. A typical Route 7 job was that of Standard Asphalt and Tar Company of Charleston, W. Va. This contract widening the 19 ft. road to 24 ft. and resurfacing over an 8-mile section.

The contractor used a Blaw-Knox "package" of bituminous paving equipment which includes model 85 and 95 road wideners, a single and dual drum trench roller, and a PF-90 bituminous paver finisher. It is interesting to note that, with the exception of the single drum roller, all of the equipment was introduced within the past three years. Trenching was done with two Allis-Chalmers graders, and surface rolling was handled with a 2-roll and a 3-roll Buffalo-Springfield roller. Some tamping was done with a Jackson vibrator.

Newest piece of equipment on the job and one of the first of these units to be manufactured by Blaw-Knox is the DTR-552, dual drum trench roller. According to superintendent Bailey, Standard was "a little up against it" for the right machine to roll the trenches. "I called my company headquarters and informed them I had to have something. They told me later that they ordered this roller from a brochure."

According to Blaw-Knox, the new roller is the first dual-compression trench-type unit. Introduced as a companion piece to the comparatively new road wideners, it is equipped with two heavy 60-in. diameter, 20-

● Aggregate for the Route 7 job was barged in on the Ohio River.

● **Widening strip base aggregate was placed by a Blaw-Knox model 85 widener, seen placing the first of two lifts of material.**

● **First machine on the widening was an Allis-Chalmers motor grader, which opened up the trench with the blade at a sharp angle.**

in. wide compression rolls which exert a compression ranging from 250 lb. per lin. in. of roll face without water ballast to 345 lb. with water. By changing the roll positions, the compaction width of the roller can be set at any width between 20 and 39 in. while the machine is in motion. This feature is said to provide a greater rolling width in a single pass, and in many cases, makes back-rolling unnecessary.

Trenches being rolled by Bailey are stepped up from 38 in. wide at the bottom, 30 in. wide at the top.

The trench was cut with an Allis-Chalmers grader equipped with a trenching blade, trench roller then making a pass. The smaller of the two wideners on the job spread a course of Ohio-specifications granular backfill, which was compacted to 5 in. depth. A second 5 in. lift was similarly constructed.

Then the spreader, equipped with attachments for handling bituminous mix, placed a course of Ohio B-35 specification bituminous base mix, which was rolled to 3 in. This operation was repeated, bringing the widening trench up to the surface of the existing roadway.

The rubber-tired Blaw-Knox paver then followed with a 25,000 ton spread of hot mix for the finished job.

The model 95 widener reportedly spread as much as 2,700 tons of stone in 12 hours. Stone was placed 6 in. deep and from 6 to 8 ft. wide.

Aggregates from old materials, new business

Four years ago, a Detroit building supply contractor took into account the deluge of old concrete discarded yearly on city dumps and acted on an

● **Souter Sales' crushing plant on Detroit's near eastside. Extra-heavy duty air cleaners on the GM Detroit Diesel plant, arranged in series, were recommended by the engine supplier, to trap harmful silicate dusts arising from the concrete crushing operation.**

idea for reworking this scrap material into aggregate for asphalt paving.

Souter Sales of Detroit, is today crushing up to 500 tons of this scrap concrete per day, and is now about to expand the operation to other midwestern cities. The wide acceptance of this "stone" for paving work for filling stations, parking lots and recreation areas has tripled the company's production since the operation started in 1952.

Scrapped concrete is delivered directly to the company's location on Detroit's eastside by contractors and city sidewalk maintenance crews, looking for a convenient location at which to dump.

Unscreened and unwashed, the crushed concrete can be marketed at a price that enables paving contractors to cut material costs without reducing the quality of sub surface materials. The fusing quality of cement plus the more irregular shape of crushed concrete stone provides a no-roll base that compacts better than ordinary roadstone.

The company uses a 25 x 36 in. Universal jaw crusher equipped with a single 30-foot conveyor for convenient loading of trucks. Power for the unit is provided by a 6-71 Detroit Diesel engine.

Despite the highly abrasive silicate dusts encountered in crushing concrete, preventive maintenance procedures recommended by Peninsular Diesel, Inc., Detroit Diesel engine distributors, and extra-heavy duty air cleaners have kept engine maintenance costs to a minimum, according to the company. Present facilities were set up in 1954 and are manned up to 15 hours per day.

Paving technologists meeting planned for Atlanta

The largest-yet attendance is expected at the three-day annual meeting and technical session of the Association of Asphalt Paving Technologists, which will be at Atlanta Biltmore Hotel, Atlanta, Georgia, February 25-27. A program of technical papers and symposium on "Compaction of Asphaltic Concrete" will be presented.

In making this announcement, Ward K. Parr, Secretary-Treasurer of the Association, announces that Volume 25 of the Proceedings of the Association, composed of papers presented at the 1956 meeting at Cleveland, is available at price of $6.50 per copy. Send remittance to the Association of Asphalt Paving Technologists, 1224 East Engineering Building, Ann Arbor, Michigan.

Wetter than Water!

Moisture creates problems in building asphalt roads. The following simple demonstration shows how to lick these moisture problems economically and obtain good asphalt coatings . . . the type of coatings necessary for roads that last.

1 Ottawa Sand, a reference aggregate which is hard to coat, is put into each of two jars and covered with tap water. An asphalt cutback (any cutback) is poured into one jar. The same cutback treated with ½% PAVE is poured into the second jar.

2 The jars are sealed and shaken vigorously for just two seconds. This short period of agitation brings the sand in contact with the asphalt under the toughest of all coating conditions.

3 PAVE treated asphalt quickly displaced water from the surface of the sand and produced a perfect mix. Untreated asphalt will not coat.

If you would like to perform this demonstration yourself using your own asphalt and aggregate, write...

PAVE helps asphalt road builders speed-up the production of mixes . . . prevent stripping of newly laid asphalt . . . coat beneath the surface in penetration work . . . lay tack coats and seal coats that last . . . reduce freeze-thaw action . . . make stockpiles that will not strip . . . stick patches in wet chuck holes . . . reduce costs . . . and build better roads.

Carlisle Chemical Works, Inc.

Reading, Ohio

manufacturers of

fine industrial chemicals

PAVE HEAT-STABLE

circle 218, page 16

Texas Highway Department

Steps Up Its Use of

Precoated Aggregates for Surface Treatment

Precoating believed by many engineers to be answer to problem of dusty aggregates for surface treatments and seal coating work.

TEXAS state highway jobs awarded late in the 1956 season included five primary or interstate route segments, for which all or part of the aggregates for surface treatment were specified to be coated. The idea of coated cover stone is not new, but there is a new interest in its potential advantages of dust elimination and general improvement of treatment quality.

In an effort to round up the latest experience and thinking on the subject, the Roads and Streets editors discussed the subject with Texas representatives of the Asphalt Institute and with construction and maintenance men in the Texas highway department. The following summary is the result. While various oils and other products of the refinery have been used to coat aggregates, these remarks will be confined strictly to asphaltic materials.

• *History of Method.* While the use of precoated aggregates dates back some years, one finds very little literature. A patented product called "Seal Rock" was used in the late 20's, with a light distillate as the precoating agent. Then there is mention of "Precoat," a patented product manufactured by dipping the aggregate in emulsified asphalt and stockpiling it for later use (Book "Low Cost Roads," 1933). A text book by Brown and Conner (1925) refers to a product called "Sat-u-Mix" prepared by dipping the aggregate in a bituminous material, after which it was stockpiled.

What happened after that is rather vague. At the AAPT meeting in New Orleans in 1955, Ward Parr mentioned the use of a 50% crushed gravel, precoated with 1% of SC-1, which was used on U.S. 27 in Michigan. Richard Harris of the Texas highway department also mentions the use of precoated aggregate as a possible solution to seal coat headaches. Engineering News-Record, Aug. 30, 1956, carries an account of precoated aggregate employed by the New Hampshire highway department. The operation was termed Grader-Seal, whereby ⅝-in. chips were road-mixed with a blade using MC-O and 1% anti-stripping agent, then spread on .15 gal. per sq. yd. of MC-3. After spreading and rolling this treated material, it was covered with 8 to 15 lb. per sq. yd. of ⅝-in. chips.

Dusty Aggregate

It is conceded by most Texas engineers that dusty aggregate is one of the big problems in the construction of surface treatments. Washed aggregate would be an improvement but this requirement by the user might not always be justified from an otherwise economic producer. And the roadside plants would certainly be handicapped.

• *One Experiment.* The use of precoated aggregate in Texas has grown haphazardly. Hugh Wallace, a southwestern division engineer for the Asphalt Institute at Dallas, recalls the placing of an experimental section on state highway 71 near Austin by state forces in 1949, whereby three types of aggregates were used: crushed limestone, plain and precoated; limestone rock asphalt, plain and precoated; and a local gravel which had been precoated with a dilute emulsion. Thus there were six panels, or sections, of the three types of aggregates. The rates of application for the binder are not stated, but a lesser amount was used on the precoated sections.

The point to make about this experimental project was the lack of agreement by the various engineers, as to whether greater retention of aggregate was found on the precoated sections or on the plain aggregate sections. There is still a difference of opinion. Also on many such experimental projects it has long since been covered over with a resurfacing job.

About this time Uvalde Rock Asphalt Company started active promotion of their precoated limestock rock asphalt aggregate. They use the same flux oil for precoating as is used in the processing of their cold mixes.

Along about 1952, Servtex Materials Company, New Braunfels, began experimenting with a view of offering a precoated aggregate to the trade. OA-230 (AC-4) which happened to be in storage was used with a fair amount of success, but still with some difficulty in producing a uniform product with the small asphalt content. For sized aggregates of ½ in. and larger about 1% of OA-230 was used; on smaller sizes about 1.3%. Stone with any slight excess of OA-230 would not handle too well through spreader boxes.

Emulsified asphalts were also tried here, but were never completely satisfactory. Rapid curing cut-backs would probably have done a good precoating job, but there was the fire hazard as all the processing was done in a conventional hot-mix plant.

All during the 1955 season, the state used a blend having a Furol viscosity of about 200 seconds at 180°. This blend was found to be very satisfactory. Servtex is now using a material produced by Col-Tex Refining Co., called Precoat No. 6, Furol

viscosity at 122° of 355 seconds with 17% cutter stock off at 680°.

Standard Industries at Tulsa has made some precoated aggregate using SC-5 that looks very satisfactory according to Institute engineers. Any Asphaltic material that would give good coating with firm strength sufficient to bind the dust to the aggregate and readily pass through the spreader should be satisfactory. It is possible that a precoated aggregate could be made by blade mixing, but the Institute men prefer the pre-dried type.

● *Present Specifications.* At present this is the specification by the Texas highway department for precoated aggregate:

Description: This item establishes the requirements for Precoated Aggregate to be used in the construction and repair of surface treatments.

Materials: The aggregate used shall be Type B of the grade or grades selected from those prescribed in Item 351, "Aggregate for Surface Treatments." It shall be treated (coated or fluxed) with from 0.5% of approved asphaltic material meeting the requirements of Item 350, "Asphalt, Oils and Emulsions." Flow qualities of the treated aggregate shall be such that it may be satisfactorily spread by normally approved mechanical spreading devices.

The state highway districts that have used precoated aggregate of some sort in varying quantities prior to 1956 included Pecos (7.5 miles), Wichita Falls (10 miles), Beaumont (27.5 miles) and Dallas (about 30 miles).

The Dallas district used 15-17 gal. per sq. yd. of OA-135 per cubic yard of Texas No. 5 material, (all passing ⅝-in. round) and spread at rate of one cubic yard per 90 square yards.

Major use of coated aggregate was made in the Brownwood district totaling 155 miles with Grade 4 stone (all passing ⅝-in. round) at same rate.

● *Cost Data.* Cost figures available from two sources are of interest here:

In the Beaumont district from 1952 to 1955, the aggregate used was precoated limestone rock asphalt, all passing ⅝ in., with .12 to .20 gal. asphalt per cu. yd. (0A 135 or 0A 175), with a spread of 1 cu. yd. to 110 sq. yd., for a cost of 11⅛ cents per square yard. Traffic varied from 7,000 to 15,700 vehicles per day.

The same district placed 50 miles of surface treatment using crushed stone, Grad 3, all passing ⅝-in. round, spread 1 cu. yd. to 110 sq. yd. and .25 to .3 gal. of OA per sq. yd., at a cost of .091 cents per sq. yd. Traffic count 1,600 to 2,300 per day.

This district also did seal coat work last year with state forces, using precoated aggregate. Some of the increased cost of the precoated aggregate, according to district construction engineer C. H. Brown of Beaumont, could be attributed to slow production due to high volume of traffic. As for rolling, the Beaumont district was definitely of the opinion that less rolling is required for the precoated stone. Only pneumatic rolling is used at about 6 to 8 hours per mile, compared with both flatwheel and pneumatic for 12 to 14 hours per mile on the plain stone.

Some Cost Data

In the Corpus Christi district, prior to 1955, precoated aggregate was used within cities to placate the taxpayers, that is, to get rid of the dust. In 1955, a short section was sealed with precoated aggregate and 75 miles sealed, using plain aggregate. The spread was 1:85 for the precoated, Grade 2, passing ⅜-in. round, .25 gal. OA-175 per sq. yd., for cost of .0838 plus rolling at $2.25 per hour.

The plain aggregate spread was 1:90, Grade 2, and .3 gal. OA-175 per sq. yd., at a cost of .079 cents per sq. yd., plus rolling at $2.25 per hour.

The 1956 program in the Corpus Christi district consisted of 118 miles precoated aggregate and 109 miles plain. The cost was within 1 mill of being equal, i.e., .087 cents for plain, and .088 cents for precoated, plus cost of rolling at $2.75 per hour.

The loss of aggregate is a factor in cost comparison. As stated by T. O. Foster, district engineer at Corpus Christi, there is almost 100% retention of the precoated aggregate and loss of the plain aggregate as high as 40%. One can readily see that 40% of the aggregate represents a sizeable cost, and this does not include future maintenance with new chips to stave off bleeding.

● *Summing up.* These points are apparent advantages of precoated aggregate summed up by the Texas engineers:

Greater yield of aggregate distribution (1.90 to 1:110).

Dust is eliminated, during construction and for the traveling public.

No bleeding.

Color will bleach out to parent rock.

Very little loss of aggregate.

Better bound, consolidated surface.

A disadvantage is possible streaking of the asphalt cements due to small quantities to be applied, particularly where small size aggregate are used. Also the use of precoated aggregate is not a cure-all. You can still have raveling by too little asphalt, and a high loss of aggregate.

T. O. Foster, of Corpus Christi, however, recently stated: "It is entirely possible that we may use 100% precoated aggregate in our 1957 seal coat program. We are giving this serious consideration at this time, but have not definitely arrived at a decision. Within the past 18 months, we have also started using precoated aggregate on our new farm-to-market road construction which, in general, has a double asphalt surface treatment for wearing surface.

"We normally use Grade 1 and Grade 10 aggregate in these doubles with a total of .5 gal. per sq. yd. of OA-175 where dry rock is used. If precoated aggregate is used, the total liquid asphalt application should not be over .45. We have found that by using precoated aggregate, we can place these doubles in this area during the winter months and have a very satisfactory surface. This precludes the carrying over of open bases with its attendant difficulties.

"Of course, we all realize that precoated aggregate is nothing new, however, as far as we are concerned. I believe we are just beginning to recognize its good qualities."

CIMA elects new executive officers

Those who have known Robert P. McKenrick through his long association with Blaw-Knox Company will be especially interested to hear he has been elected Executive Vice President of the Construction Industry Manufacturers Association. The association's address is 135 South La Salle St., Chicago 3, Ill.

McKenrick will have as his assistant Carl G. Allen who has a wide experience in association work, including recently the secretaryship of the National Construction Machinery Credit Group, comprising numerous members of CIMA.

McKenrick, following work as a construction engineer with the Pennsylvania department of highways, in 1927 became a service engineer with the Construction Equipment Department of the Blaw-Knox Company at Pittsburgh. He became in 1946 manager of the firm's Construction Equip-

ment Department at Pittsburgh, and in 1956 Vice President and General Manager of the Construction Equipment Division at Mattoon.

In addition to the long experience in the construction industry, McKenrick brings to CIMA a background of national association work. He served as chairman of the Manufacturers Division and on the Board of Directors of the National Sand and Gravel Association. Was a member of the Truck Mixer Manufacturers Bureau—on the Board of Directors (Manufacturers Division) of the National Concrete Masonry Association—a member of the American Concrete Institute (served on Committee 609), and was a member of the Industry Round Table of the Associated Equipment Distributors.

Rubberized Asphalt

(Continued from page 216)

done an excellent job of retaining chips despite heavy traffic and extremely low-temperature winter conditions. This tends to validate the highway department's original thinking that rubberized asphalt will pay for itself in longer life and less maintenance costs. For example, if an ordinary seal will need resealing in three years, RC-3D will be good for at least four years. This means that in a 12-year period of maintenance, resealing would be required four times with unrubberized RC-3 and only three times with RC-3D. This is a real savings which is becoming vital to successful operation of highway departments because men, materials, time and money must be stretched more than ever before.

From the over-all point of view the actual improvement is even greater than this 36% because the curved part of the pavement represents less than the 50% weight it was given in the calculation of the chip retention. On an area weighted basis the true improvement in chip retention after one year is 14%.

Because this may be such a remarkable improvement in a road material, and because of the intense interest in its performance, it is the authors' purpose to report the progress of the job annually by means of photographs of the test sections and the corresponding chip counts. It is hoped that by presenting the facts in this manner, materials highway engineers will be in a better position to appraise rubberized asphalts for their respective states and thus assure the taxpayers that their tax monies are being used to best advantage.

Slurry Sealing ahead of resurfacing as . . .

Bitumuls and Asphalt Put New Life in Famous Ridge Route on U. S. Highway 99

On a 41 mile stretch of the Ridge Route, (U. S. Highway 99), between Los Angeles, California, and the Kern County line, heavy auto, bus and truck traffic had caused serious deterioration of various sections of old pavement. So the California Division of Highways called for bids by June 21, 1956, for one of the largest resurfacing contracts ever let.

The job called for a total of 21 miles of multi-lane asphaltic concrete resurfacing; 13 miles of sub-sealing, crack-sealing, and priming of old rigid-type pavement ahead of resurfacing; 8 miles of sealing and priming existing bituminous four-lane divided roadway; and extensive shoulder work. Total estimated cost was over one-half million dollars.

A 3" ASPHALTIC CONCRETE COURSE of 200-300 Penetration asphalt, ½" to ¾" maximum-size aggregate, was used to restore riding qualities to old, rigid-type, three-lane pavement now serving as one-half the roadway on 13 miles of U. S. Highway 99.

Contract awarded—Successful bidder on the job was Schroeder & Co., Sun Valley, California. Completion was scheduled for January, 1957, so work began immediately. At a central site on the job, aggregate production and plant-mixing equipment was set up. Carefully-calculated Bitumuls and asphalt requirements were reviewed with the Field Engineers of American Bitumuls & Asphalt Co., and a precise delivery time-table was drawn up to keep all phases on the job moving.

Asphalt & Bitumuls big items—The quantities of asphalt and Bitumuls required are impressive: for sub-sealing, 1700 tons of Grade 10-25 Air Refined Asphalt; for resurfacing, 3500 tons of 200-300 Penetration Paving Asphalt; for seal and prime work, 140,000 gal. of Bitumuls.

Resurfacing rigid-type pavement—Here's how the job progressed: on the old rigid-type pavement, slabs were drilled and sub-sealed with air-refined asphalt. Then the cracks and joints were filled with either Bitumuls Slurry Seal, or a joint-sealing compound, or a combination of both.

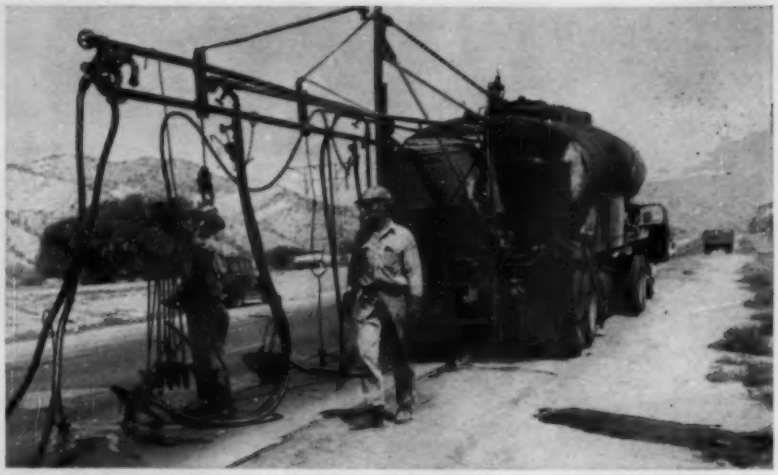
Asphaltic concrete (Paving Asphalt mixed with ½" to ¾" maximum-size aggregate) was then trucked from the

plant and spread in two lifts (a levelling course and a surface course) to provide a uniform 3" thickness. Using two spreaders, each equipped with special shoulder extensions, this mix was placed to a full width of *37 ft. in a single pass.* In this way, despite long hauls (some up to 30 miles), as much as 1200 tons of mix were placed in a single day.

Resurfacing bituminous paving — The existing bituminous pavement required only a 1" overlay of asphaltic concrete as opposed to the 3" specified for the rigid-type section. Ahead of the placement of this 1" thickness, Bitumuls Slurry Seal was used to seal and prime the old surface. (Bitumuls Slurry Seal is a mixture of Bitumuls Emulsified Asphalt, selected fine, sharp sand and/or fine stone screenings, and sufficient water to produce a free-flowing slurry. Batched into a transit-mix truck, these materials are mixed en-route; discharged onto the pavement; applied at full lane-width by a squeegee-mounted spreader-box).

This job, because of its unusual size and many complexities, provides an excellent example of the ability of American Bitumuls & Asphalt Co. to deliver a full line of asphaltic products to meet every need; and to furnish the on-job field-service that can often mean the difference between profit and loss. Whether your next project is a resurfacing operation or new construction, it will pay you to check with our office nearest you for *all* your asphalt requirements.

American Bitumuls & Asphalt Company
200 Bush Street
San Francisco 20, Calif.



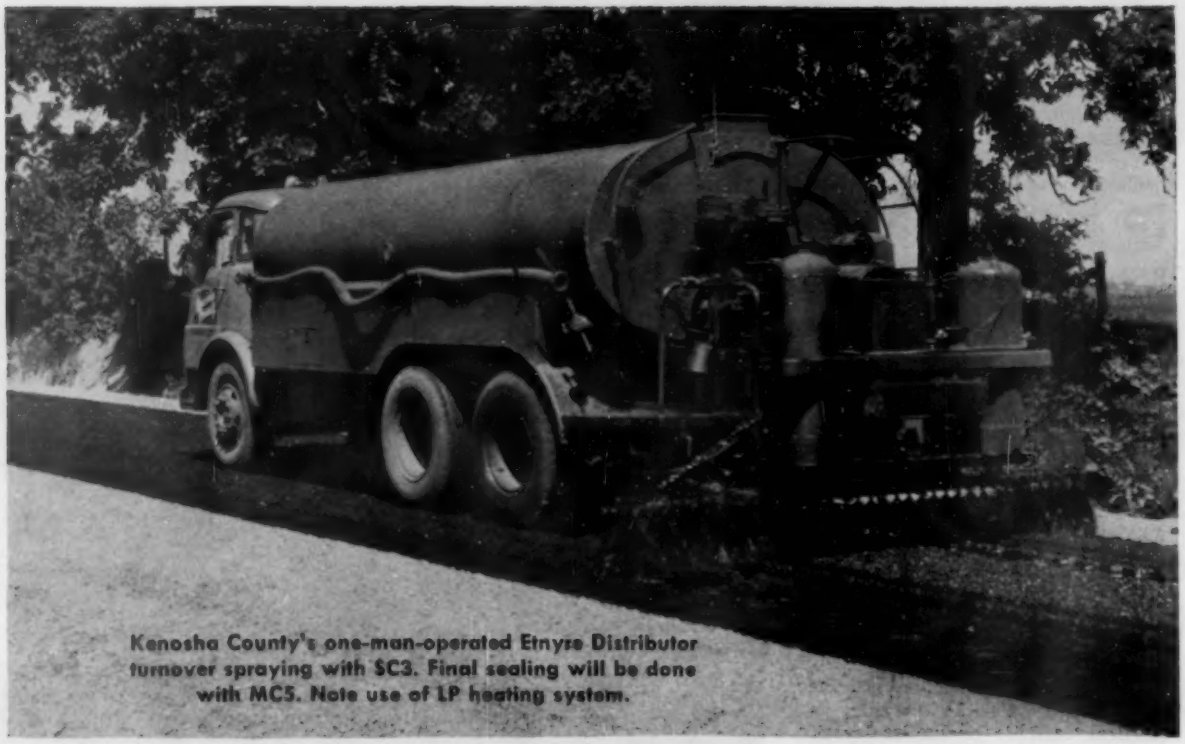
HOLES WERE DRILLED in the rigid-type pavement at minimum intervals of ten feet. Air-refined asphalt (Grade 10-25) was then pumped in at an average of 27 gal. per hole to sub-seal the pavement.

CONTRACTOR SET UP modern aggregate production and mix-plant equipment at a central location on the job. Nature of project still required hauls of up to 30 miles.

THIS PHOTO, taken on one of the largest resurfacing jobs ever let, shows (left to right): Neil Boles, Field Engineer, American Bitumuls & Asphalt Co.; Johnny Hayden, Estimator and General Sales Manager, Schroeder & Co.; Bob Norman, Inspector, California Division of Highways; Everett Leucart, Job Superintendent, Schroeder & Co.; Don Frischer, Resident Engineer, California Division of Highways; Herb Belford, Assistant District Engineer, California Division of Highways; H. E. "Red" Schroeder, President, Schroeder & Co.

See you at the Road Show, Chicago, January 28—February 2; Booths 81-82, Materials and Supplies Section.

. . . for more details circle 252, page 16



Kenosha County's one-man-operated Etnyre Distributor turnover spraying with SC3. Final sealing will be done with MC5. Note use of LP heating system.

Kenosha County finds "Black-Topper" fast...reliable...easily operated by one man!

"Our 2700-gallon Etnyre Bituminous Distributor has greatly expedited the schedule of a large highway improvement program that we are completing," says Mr. Ben Zeiken, road foreman for the Kenosha County Highway Department.

"The Etnyre Distributor's large capacity and mechanical reliability have enabled our graders and other road machinery to operate closer to maximum efficiency. In the Etnyre Distributor's two years of service, no mechanical trouble has been experienced. Engine starts are fast and reliable, and we have no trouble with nozzle-clogging. We get a clean spread with no wet or dry spots, regardless of the material being distributed. This is true both in turnover operations and final surface-sealing. One man easily operates our Etnyre Distributor."

Get the full story now on all the benefits for you in Etnyre superiorities. Data and prices are yours for the asking from your nearby dealer. Or write today to E. D. Etnyre & Co., Oregon, Illinois, U. S. A.

SEE YOUR ETNYRE DEALER

ETNYRE

"Black-Topper"

BITUMINOUS DISTRIBUTORS

. . . for more details circle 233, page 16

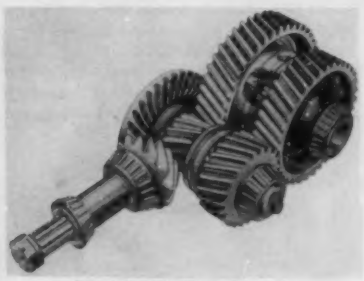
What's New
in Equipment and Materials

Reader Service Coupon on Page 16—See also items beginning on page 176, and Road Show exhibit items, page 104.

2-Speed Driving Axle

A new "Wide-Range" 2-speed driving axle, announced by Timken-Detroit Axle Division, Rockwell Spring and Axle Co., 100-400 Clark Ave., Detroit 32, Mich., is claimed to offer all the highly desirable advantages heretofore available only through the use of complex multiple-speed transmissions or auxiliary gear boxes.

A simple switch of gear-arrangements made possible the new TDA Wide-Range axle. Its broad range was achieved by "flipping" the high-range (2) and low-range (3) helical gear sets—reversing their relative positions—to place the enlarged helical pinion of the high-range gear set where it would not interfere with the hypoid pinion (3) of the first-reduction gear set.



TDA Wide-Range Axle

For more information circle 124 on Service Coupon Page 16 and mail now.

Back Hoe Attachment for "Payloader"

A new back hoe, designed for use with the new models HH and HU, 4-wheel drive "Payloader" tractor shovels, has been announced by Wain-Roy Corporation, Hubbardston, Mass.

The ¾-yd. capacity back hoe is a completely independent unit and replaces the "Payloader" bucket quickly and easily by attaching it to the boom arm by only two pins and the hydraulic hose connections.

Back Hoe on "Payloader"

The back hoe digs and dumps at a radius of 190 degrees, enabling it to work in congested areas. With a digging reach of 12 ft. 4 in., the Wain-Roy back hoe is stated to reach to a depth of over 13 ft. and to load to a height of better than 9 ft.

Powerful down pressure and breakout force are provided by twin boom cylinders. High speeds on retraction of the dipper stick completes its faster operating cycle.

The bucket comes in standard widths of 14-, 18- and 24-in. and bellhole widths 14-, 18-, 24-, 30-, and 36-in.

For more information circle 125 on Service Coupon Page 16 and mail now.

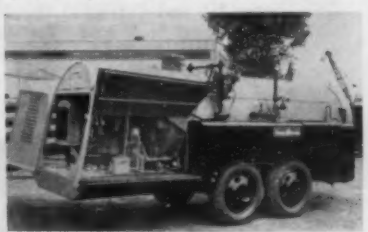
125 HP. Portable Steamer

A new PS-125 portable steamer, announced by Cleaver-Brooks Co., 326 East Keefe Ave., Milwaukee 12, Wis., offers close control for pile driving applications. One control provides full modulating control from low fire to high fire for all steam demands.

The PS-125 delivers—effortlessly—4,300 lb. of dry steam per hour from cold start in 30 minutes. The PS-125 also provides steam for heating asphalt, winter thawing, cleaning of equipment or heating buildings.

All weather protected, fully fiberglass insulated, the PS-125 meets code standards. Readily mobile, it rolls to the job towed by a truck, or skid mounted models can be easily carried. This self-contained portable boiler carries its own fuel supply—132 gal. of No. 2 oil in two fender tanks. Oil fired air atomizing burner is similar to one used on Cleaver-Brooks industrial boilers.

Engine is rated 22 hp. continuous duty at 1,800 rpm. Hand throttle controls rpm. at speeds below 1,800 rpm.



PS-125 Portable Steamer

For more information circle 126 on Service Coupon Page 16 and mail now.

Rock Body for Trucks

A new rock body, designed to withstand the severe impact shocks imposed by power shovel, chute and conveyor loading of rock, ore and other abrasive materials, has been announcel by Galion Allsteel Body Co., Galion, O.

Offered in 6 to 15 cu. yd. capacities, the new bodies feature ¼-in. steel plate construction in sides, floor and head. A ¼-in. wear plate over a 2-in. hardwood cushion protects the body floor while a 4 x 4 x ⅜-in. reinforced top roll minimizes shovel and loading damage to body sides. For especially severe service, 5/16 or ⅜ in. body shells and wear plates are available. Horizontal and vertical box braces extending up under the top roll bolster side strength and prevent bulging.

Box-type crossmembers and longitudinals distribute loading and dumping stresses uniformly throughout the body structure, it is claimed. Longitudinals are extended up under the scow end for added strength.

A 15° 24-in. scow end eliminates the need for a tailgate.

Galion rock bodies are designed for mounting on Models 880 or 1000 underbody and Model 77379 telescopic hoists. Capacities range from 15 to 25 tons.

Galion Rock Body with New 24 in. Quick-Dumping Scow Ends

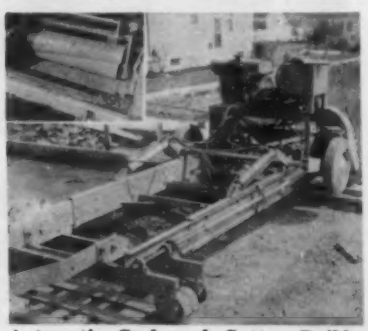
For more information circle 127 on Service Coupon Page 16 and mail now.

Curb and Gutter Builder

A new automatic curb and gutter builder capable of forming monolithic or integral roll-type curbs on paving jobs at the same time that the main slab is poured, has been announced by General Road Machines, Inc., Niles, O.

The new machine mechanizes curb and gutter forming and is stated to sharply reduce manual labor costs and to eliminate separate construction of the curbs.

In operation, a hydraulically-driven curb forming roll, spinning at 300 rpm., profiles the gutter line and forms the curb



Automatic Curb and Gutter Builder

as the machine travels along the forms behind the main paving equipment. Concrete for the curb is left along the high curb side of the slab by an accessory offset screed attachment on the finisher operating ahead of the curb builder. Easily replaced contour cams provide for changes in curb and gutter profile. The curb builders are available with curb forming roll on one or both ends of the machine for half or full width construction.

Powered by a 12 hp., 2 cyl., air-cooled engine, the automatic curb builder is hydraulically driven. Travel speeds are infinitely variable from 0 to 40 ft. per minute, both forward and reverse.

For more information circle 128 on Service Coupon Page 16 and mail now.

Excavator-Crane

A completely new redesigned truck, incorporating the Clark power train is featured in the Michigan Model T-20 excavator-crane introduced by the Construction Machinery Division, Clark Equipment Co., Benton Harbor, Mich.

It has a gross vehicle weight of 42,300 lb., with full crane equipment, and can be reduced to 37,600 lb. for highway travel by removing rear outriggers, crane boom and counterweights. For steel erection the T-20's maximum boom length is now 80-ft. with jib booms 10-15 ft. in length.

Michigan Model T-20 Excavator-Crane

The truck power train consists of a 5-speed transmission, a 2-speed transfer case and planetary wheel driving axles, all Clark-designed and built. With a 134 hp. gasoline chassis engine, the maximum travel speed is 35 mph. Ease and safety of operation is provided by hydraulic steering booster and all-wheel air brakes.

All-wheel 6 x 6 drive is standard equipment. Riding qualities have been improved through redesigned front axle overload springs. The truck chassis is of all-welded construction with 18-in. x 38-lb. Man-ten steel channel frame rails.

The crane's upper mechanism, increased from 62 to 75 bhp., has air-controlled shaft and drum clutches with power up and down on the load line. Air controlled swing brake and worm gear boom hoist are standard equipment.

For more information circle 129 on Service Coupon Page 16 and mail now.

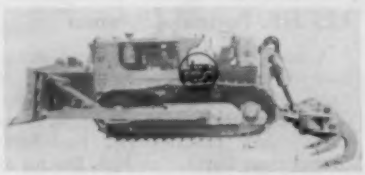
Direct Drive Pump for Ripper

Designed to maintain constant hydraulic control pressure, a new direct-drive Ateco pump for the Ateco tractor-mounted rock ripper is now available for Caterpillar D-9 tractors.

Pump is mounted at the engine power-take off just ahead of the clutch and transmission assembly, where is receives constant power while the engine is running. Hydraulic control pressure is thus maintained without interruptions due to clutch action, or to speed reduction through the torque converter.

The pump is offered as optional equipment on all new HR-D9 Ateco rock rippers, and will be available in kit form for conversion of HR-D9 units.

Specifications and prices may be obtained by writing American Tractor Equipment Corporation, 9131 San Leandro Boulevard, Oakland 3, Calif.



Direct Drive Pump with Rear Tank and Valve Provide Constant Power to Raise or Lower Ripper Independently of Clutch or Torque Converter.

For more information circle 130 on Service Coupon Page 16 and mail now.

Base and Fuel Tank Combination for Power Units

A new type of "wrap-around" base and fuel tank combination has been developed for use with the diesel power units and electric sets, of Caterpillar Tractor Co., Peoria, Ill.

The new bases have been designed for use with all Cat engines and electric sets from the D311 through the D342. Models presently in production include extended and short base versions for Cat D337 (Series F) and Cat R326 (Series F) engines, a short base model for the Cat D318 engine and electric set bases for Cat D311 and D315 diesel electric sets. Other models will be added in the near future.

New "Wrap Around" Engine Base

The new bases will replace the steel channel models formerly used. The streamlined, space-saving design will feature a greater fuel capacity, lighter weight and sturdier, more rigid construction.

Primary advantage claimed for the new bases is the ability to withstand the stresses and strains of skidding and dragging. An additional advantage is the added fuel capacity made available by their design.

For more information circle 131 on Service Coupon Page 16 and mail now.

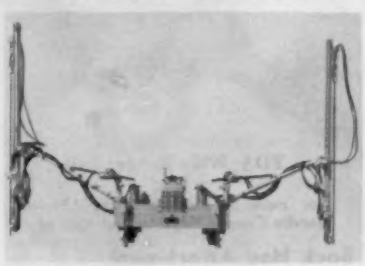
Self-Propelled Dual Drill Rig

A new self propelled dual drill rig claimed to have one of the most variable drilling patterns yet attained is being marketed by the Le Roi Division, Westinghouse Air Brake Co., Milwaukee 12, Wis. The drill is the T286.

Available with heavy feeds and two sizes of drifter drills, the rig is designed for fast drilling speeds in hard formations and easy maneuverability over rough terrain.

The new drill rig may be purchased with one or two Le Roi-Cleveland air feeds mounted on a crawler tractor powered with a 28 hp. gasoline engine. Diesel engines are also available in the tractor.

The T286 has the new, heavy-duty DR40 feed, which has a 10-ft. travel and 8-ft. steel change as standard equipment.



T286 Self Propelled Dual Drill Rig

Various size steel changes are available. The heavy-duty DR40 feed allows the use of either the D25DR or the D14DR drifters; the former is a 3½-in. drifter, while the latter is a 4-in. drifter.

The two 7-ft. arms, mounted on swivel heads, allow an arcing of the arms which provides a drilling pattern with a 24-ft. spread. The radius of turn of each arm is 220 degrees from the mounting posts.

For more information circle 132 on Service Coupon Page 16 and mail now.

Ottawa Backhoe Available for Michigan Tractor Shovel

The Big Muscle backhoe of Ottawa Steel Division of L. A. Young Spring & Wire Corporation, Ottawa, Kan., is now available for the Michigan 75-A tractor shovel.

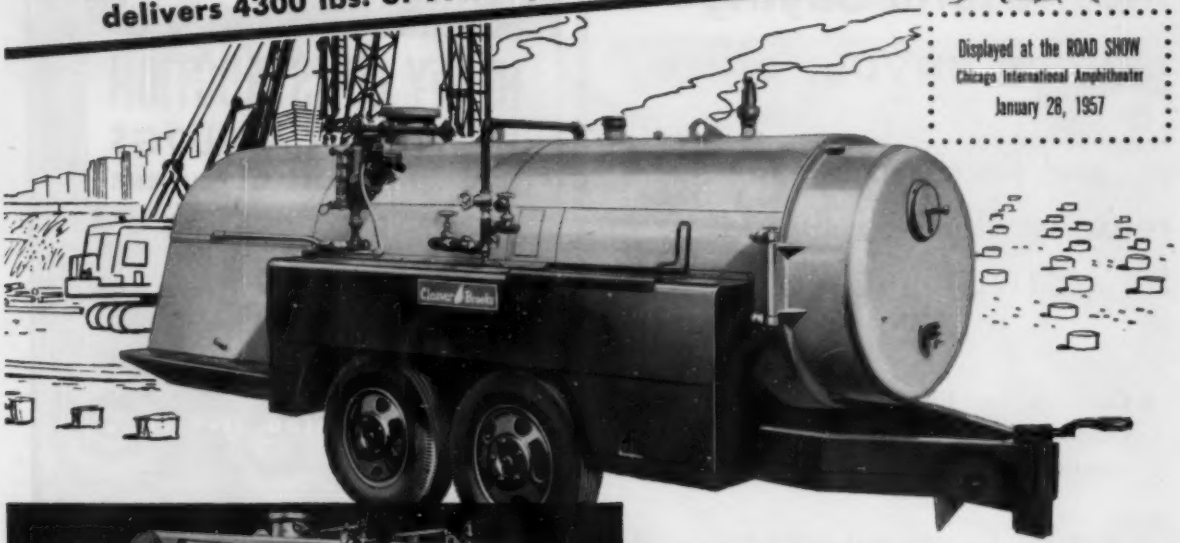
Both the Model DX-75A backhoe, which digs to a depth of 11 ft., and the Model EX75A backhoe with an 8½-ft.

(Continued on page 229)

Ready to roll, closer control!

delivers 4300 lbs. of 99% dry steam in 30 min. from a cold start

Displayed at the ROAD SHOW
Chicago International Amphitheater
January 28, 1957



EASY TO START, convenient to operate, quick to service

- For pile driving or extracting concrete, steel or wood piles.
- Provides steam for heating asphalt or ready-mix, winter thawing, cleaning of equipment, heating buildings.
- PS-125 skid-mounted model easily transported job-to-job.
- Costs less to run — has closest control known for pile driving.

NEW Cleaver-Brooks 125-hp PORTABLE STEAMER

easily towed anywhere by truck or tractor

Wherever you need BIG STEAM CAPACITY—roll in the PSM-125. This self-contained boiler plant on wheels can be dispatched anywhere . . . delivers full output in 30 min. Carries its own fuel supply—132 gals. of No. 2 oil in fender tanks.

With 99% dry steam, single and double acting pile-driving hammers maintain full rating in maximum number of blows per cycle. Rig maintains pressure continuously . . . delivers on demand, in direct proportion to the load. Plenty of reserve capacity for all hammer sizes.

PSM-125 and PS-125 (skid-mounted) units are all-weather protected and glass-fibre insulated. Rugged, welded-frame construction resists impact. Boiler built to same high standards as Cleaver-Brooks industrial boilers, fully fire-tested at the factory.

ONE CONTROL MATCHES FIRE TO THE LOAD — from low to full fire for all steam demands.

TODAY — write for complete data, including specifications. Ask for copy of catalog AD-159.

CLEAVER-BROOKS COMPANY
395 East Keefe Avenue,
Milwaukee 12, Wisconsin

Cleaver Brooks

PIONEERS OF SELF-CONTAINED BOILERS, PORTABLE STEAMERS, BITUMINOUS BOOSTERS

. . . for more details circle 303, page 16

here . . . without a doubt . . . is the most useful buying catalog in your office

. . . and here are some reasons why you should be USING IT DAILY!

- Catalogs are PREFILED — Saving you time and space required to file individual manufacturers' catalogs.
- Saves you the time and inconvenience of writing to manufacturers for catalogs.
- Gives you all the facts needed BEFORE you make a buying decision.
- Manufacturers' names and trade names indexed alphabetically for quick reference to individual catalogs.
- All the buying information is 'boiled down' — designed for your convenience.

After checking the advantages listed above, you can see why this ONE CATALOG offers you so MANY advantages . . . saving you both time and money, not only in the mechanical and physical aspects of a cataloging operation . . . BUT MOST IMPORTANT OF ALL . . . it is available WHEN you NEED it . . . BEFORE you make your buying decisions! The manufacturers represented in this catalog are literally 'meeting' with you in your office — offering you all the information you could possibly need concerning their products. Why not meet them at least half way — and USE THEIR PREFILED INFORMATION!

Here are the manufacturers represented in Gillette's Heavy Construction Prefiled Catalog:

American-Marietta Company
American Steel & Wire Div.
Anthony Company
Armco Drainage & Metal Products, Inc.
Arrow Manufacturing Company
Austin-Western Company
Baldwin-Lima-Hamilton Corporation
Barber-Greene Company
Blaw-Knox Company
Brisco Manufacturers of Calif.
Bros Boiler & Mfg. Co., Wm.
Buffalo-Springfield Roller Co.
Butler Bin Company
Carey Manufacturing Co., Philip
Chrysler Corporation, Industrial Engine Div.
Clark Equipment Company
Cleaver-Brooks Company
Cleveland Form Grader Co., The
Cleveland Trencher Co., The
Colorado Fuel & Iron Corp., The
Continental Motors Corporation
Cummer & Son Co., The F. D.
Cummins Engine Co., Inc.
Detroit Diesel Engine Div.
Electric Tamper & Equipment Co.
Flexible Road Joint Co., The
Flintkote Co., The
Gar-Bro Manufacturing Co.
General Motors Corp.
Goodall Rubber Company
Harnischfeger Corporation
Heil Company, The
Heltzel Steel Form & Iron Co., The
Henry Manufacturing Co., Inc.
Hough Company, The F. G.
Huber-Warco Company, The
Ingersoll-Rand
International Harvester Co.
Jackson Vibrators, Inc.
Jay Manufacturing Company
Keystone Asphalt Products Company
La Crosse Trailer Corporation
Le Roi Company
Le Tourneau-Westinghouse Co.
Littleford Bros., Inc.
McKiernan-Terry Corporation
Mid-Western Industries, Inc.
Minneapolis-Moline Company
Naugatuck Chemical Div.
Owen Bucket Company, The
Phoenix Products Company
Pioneer Engineering Works, Inc.
Prehy Company
Republic Steel Corporation
Rogers Brothers Corp.
Seaman-Andwall Corporation
Servicised Products Corp.
Shawnee Mfg. Co., Inc.
Stow Manufacturing Co.
Symonds Clamp & Manufacturing Co.
Timken Roller Bearing Co., The
Toncan Culvert Manufacturers Association
United States Rubber Company
United States Steel Corp.
United Steel Fabricators, Inc.
Wellman Engineering Co., The
Westinghouse Air Brake Co.
Wick Wire, Spencer Steel Div.
Wico Electric Company
Williams Bucket Div.
Williams Form Engineering Corp.
Wisconsin Motor Corporation

Ottawa Backhoe on Michigan Tractor Shovel

digging depth, can be equipped with buckets from 12 in. to 36 in. in width.

The patented automatic ejector bucket, an exclusive feature of the Ottawa backhoe, is stated to positively eject wet or sticky materials without loss of cycle time.

Another exclusive feature, the Ottawa One-Trol, assures fast, smooth operation by the use of only two levers to control all actions which normally require the use of multiple levers.

Power is obtained from the Michigan hydraulic system. All hydraulic cylinders are of the double acting piston type, with chrome plated rams. The Ottawa backhoe is mounted by removing the rear counterweight.

For more information circle 133 on Service Coupon Page 16 and mail now.

Bulk Cement Transport Body

A new bulk cement transport body, model SST-11, announced by Baughman Manufacturing Co., Jerseyville, Ill., has been designed for bigger payloads and faster discharge.

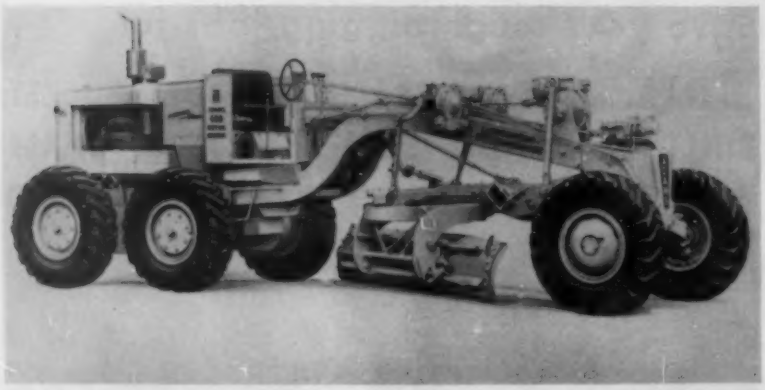
Bigger payload has been achieved by new body design and new operating mechanism that features fewer working parts. Truck or trailer units are available fabricated in aluminum, magnesium or steel, in lengths from 10-ft. to 34-ft. The trailer unit is self-supporting, mounted on running gear of your choice.

Faster discharge has been accomplished by means of a 9-in. auger located in bottom of body having 45° sloping sides. Body compartments and trip doors keep weight of material off auger and permit selective unloading when necessary.

The new unit has an overall height of 70-in., and overall width of 87-in. and is available in lengths from 10-ft. to 34-ft. The approximate capacity per lineal foot of body shown in accompanying illustration is 23 cu. ft.

Model SST-11 Bulk Cement Transport Body

For more information circle 134 on Service Coupon Page 16 and mail now.



Adams POWER-Flo 660 Grader, Powered by 160 hp. Diesel Engine.

Torque Converter Road Grader

A new addition to their Adams line—a torque converter model of the "660" motor grader—has been announced by LeTourneau-Westinghouse Co., Peoria, Ill.

Designated as the Adams POWER-Flow 660, the unit has basically the same design features as the standard model "660" with the additional operational advantages of a torque converter drive train plus a 27% increase in engine power.

The POWER-Flow grader teams a 190 hp. diesel power plant with a single-stage torque converter and four range constant mesh transmission. Tripling available torque, this drive system provides the equivalent of an infinite number of gear ratios which adjust automatically to variations in load requirement. The advantages stated to result from this flexibility of power include increased efficiency, cushioning of shock load, reduction of mechanical wear and tear as well as greatly simplified operation.

An exclusive feature contributing to the speed and ease of handling of the new POWER-Flow 660 is a mechanism which allows the operator to make changes in travel from forward to reverse, and vice versa, without hand shifting. Another item to help the operator and let him give full attention to the machine's work functions is a tail shaft governor which automatically adjusts engine speed.

The torque converter constant mesh transmission combination of the Power-Flow 660 provides four forward speed ranges from a creeping .23 mph. to 27.4 mph. The instant reverse provides an equal number of ranges from .22 mph. up to 24.4 mph.

Engine options for the new grader are either the Cummins HRFB1 600 or the GM 6-71, both rated at 150 hp.

For more information circle 135 on Service Coupon Page 16 and mail now.

Cab for Tractors

A new comfort-cab for its Super 99 and Super 99 GM tractors has been announced by the Oliver Corporation, Chicago, Ill. Full "stand-up" height and panoramic visibility for both sitting and standing positions are featured. A sloping, full-width, full-height windshield is standard equipment, and a complete selection of side and rear enclosures is offered—demountable hinged side windows, glass-windowed rear doors or canvas rear curtains. Extra roominess plus good visibility in all directions provides all-weather protection without that tiresome hemmed-in feeling. The top is rugged sheet steel covered with an insulation material that absorbs sound.

New Cab for Oliver Tractors

For more information circle 136 on Service Coupon Page 16 and mail now.

35 Ton Truck

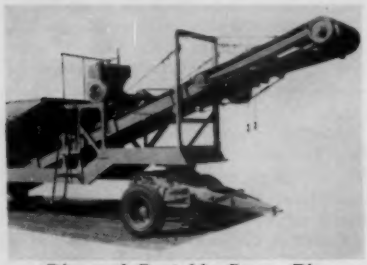
A new model 35SL 35 ton truck has been announced by the Dart Truck Co., 27th Ave. and Oak Sts., Kansas City, Mo. The truck carries 24 cu. yd. (struck). The new model has a 400 hp. diesel driving through a down-hill retarding torque converter and a special design, heavy-duty 3-speed transmission.

Dart Model 35SL 35 Ton Truck

For more information circle 137 on Service Coupon Page 16 and mail now.

Portable Surge Bin

A portable bin, announced by Diamond Iron Works, a division of Goodman Manufacturing Co., Halsted St., and 48th Place, Chicago 9, Ill., is designed to provide greater continuity of operation for any type portable crushing and screening plant. The 11 cu. yd. hopper of the bin serves to receive the material produced by a plant and load it into trucks by means of its 36 in. wide conveyor at the rate of 7 yds. in less than one minute. The surge bin is clutch controlled from platform or ground, has a 9 ft. 5 in. clearance under the head pulley, and is equipped with an air cooled engine with fluid coupling. Construction throughout is heavy without affecting portability.



Diamond Portable Surge Bin

For more information circle 138 on Service Coupon Page 16 and mail now.

Air Operated Sump Pump

A new, air operated sump pump has been placed on the market by the Le Roi Division, Westinghouse Air Brake Co., Milwaukee 1, Wis. The pump is rated at 340 gal. per minute against a 10-ft. head.

Features of the new pump, which operates with a maximum head of 95 ft., include light weight construction, low air consumption, a governor-controlled motor, and a built-in lubrication system.

The pump has a base diameter of 8 in. and is 23 in. high. It has an air inlet of ¾ in. in diameter, while the discharge outlet is 2½ in. in diameter. Net weight of the steel model is but 56 lb.; the bronze model weighs 75 lb.

New Air Operated Sump Pump

For more information circle 139 on Service Coupon Page 16 and mail now.

Portable Space Heaters

Seven additional improvements stressing even safer operation and simpler controls are featured in the 1957 line of Herman Nelson portable space heaters.

(Continued on page 232)

Herman Nelson Utility Model GT3091A

The new line includes both oil and gasoline fired units in capacities from 50,000 to 450,000 BTU per hour. The low-cost "Thrifty" model is powered with a ⅓ hp. electric motor. The "Utility" model features optional power plants, quickly interchangeable between gasoline engine and electric motor. The "De Luxe" is an all-automatic unit with optional, remote temperature control.

Descriptive literature is available from American Air Filter Co., Inc., 215 Central Ave., Louisville 8, Ky.

For more information circle 140 on Service Coupon Page 16 and mail now.

Pile Driving Hammer

A new mobile portable differential acting pile driving hammer, the DGH-100, has been added to the line of Vulcan Iron Works, Inc., 327 N. Bell Ave., Chicago, Ill.

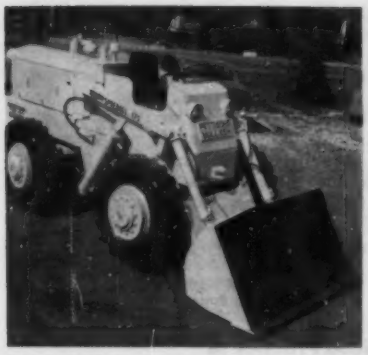
The hammer is fully automatic in operation, small enough to carry in a jeep, and operates with compressed air or steam. The hammer is just over 4-ft. long, delivers a rated striking energy of 386 foot pounds and works on the same principle as the Super-Vulcan. Its total weight with impact plate is 786 lb.

DGH-100 Pile Driving Hammer Breaking Curb

For more information circle 141 on Service Coupon Page 16 and mail now.

Tractor Shovels Equipped for Night Work

Headlights, rear lights, and stop and taillights are now standard equipment on all three Speedall models of Pettibone Mulliken Corporation, 4700 W. Division



Speedall Tractor Shovel Equipped for Night Work

St., Chicago 51, Ill. The 1¼, 1½, and 2½ cu. yd. standard Speedall tractor shovels are now fully equipped for night work on highway and off-highway applications.

Two sealed beam headlights at the front and a sealed beam floodlight at the rear provide full job illumination, and a large combination stop and taillight provides an additional safety factor for night work. Other standard equipment on the new Speedall tractor shovels includes Speedmatic power-shift transmission, planetary axles, torque converter, power steering, power braking, and hydraulic accumulator.

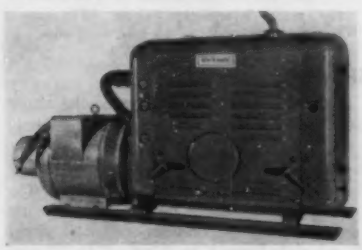
For more information circle 142 on Service Coupon Page 16 and mail now.

Gasoline Electric Plants

Two new groups of gasoline electric plants have been added to the line of generators of Gen-A-Matic Corporation, 14741 Bessemer St., Van Nuys, Calif.

Both air and water-cooled models, with ratings from 400 to 75,000 watts, are now available, as well as three separate lines of diesel electric plants ranging from 10,000 to 300,000 watts. The diesel electric plants are operated by General Motors, Waukesha and International engines.

Both Gen-A-Matic portable electric plants, ranging from 850 to 5,000 watts, and the Group II (non-diesel) plants currently being introduced are available with automatic and semi-automatic control apparatus for special applications and any desired control configuration may be specified.



Gen-A-Matic Model 300-A Electric Plant

For more information circle 143 on Service Coupon Page 16 and mail now.

Porto-Plant Portable Concrete Batching Plant

Portable Concrete Batching Plant

A portable concrete batching plant developed by L. Burmeister Co., 4535 W. Mitchell St., Milwaukee 14, Wis., is claimed to have the capacity and accuracy of a permanent plant. The new plant is stated to be able to deliver more than 100 cu. yd. of concrete per hour.

Physical components of the Porto-Plant include: a hinged aggregate bin complete with batchers and scales in position for over-the-road hauling; portable belt conveyor on wheels; and portable Burmeister WeighMeister batching unit.

The entire unit when set up requires the attention of only one man who, through a centrally located electrical panel, operates every action with push buttons. The completely interlocked cycle makes it impossible to batch incorrectly.

The 125-130 ton capacity three compartment aggregate bin has hinged sides for low clearance when being transported, and can be mounted on skids or wheels. The cement hopper holds 350 bbl. Cement delivery may be by rail or truck. No cement is conveyed by belt at any time. Central mix batching can be accomplished by using the Porto-Plant in conjunction with the Burmeister tilting mixer in 1 to 7 yd. capacity. Batchers are readily transported in position for immediate operation.

For more information circle 144 on Service Coupon Page 16 and mail now.

Repellent Reduces Concrete Spalling

A silicone resin specifically designed to reduce spalling of concrete bridges and highways is now being marketed commercially by Silicones' Division Union Carbide and Carbon Corporation, 30 East 42nd St., New York 17, N. Y.

"Spallbar" repellent may be used on highways as soon as the concrete has set sufficiently to support the weight of spraying equipment. It may be applied at temperatures varying above 15 degrees Fahrenheit. Low temperatures only reduce the rate of solvent evaporation. Naturally it should not be applied where concrete is water saturated or ice has formed.

"Spallbar" repellent is not water soluble. As a result, it is better able to resist loss in repellency from rain. Other advantages claimed for the new highway water repellent are its superior resistance to freeze-thaw tests and its greater resistance to alkalies. Also, "Spallbar" repellent employs a solvent of low volatility and high flash point, thus minimizing the hazards of toxicity and combustion.

Silicones Division, Union Carbide and Carbon Corporation sells "Spallbar" highway water repellent in 1-gal. bottles and 5 and 55 gal. drums as an 82 per cent solution of silicone resin. When one part of "Spallbar" repellent is mixed with 54 parts of mineral spirits, a 2 per cent, ready-to-apply solution results. The silicone is effective as soon as the solvent evaporates.

For more information circle 145 on Service Coupon Page 16 and mail now.

Low-Bed Trailers

New models of trailers, announced by Talbert Trailers, Inc., 7950 West 47th St., Lyons, Ill., are available with 8 or 16 tires in either 15 or 20 in. diameter wheels and fixed or removable goosenecks with either level or drop decks. The Talbert Model TTD-60-RG trailer shown here is equipped with 16 20-in. tires and a Talbert single axle jeep dolly which increases allowable gross loads where permitted in some states. This particular trailer is owned and operated by Robinson Cartage Co., Grand Rapids, Mich. The load is a Northwest crane. By making use of the Talbert removable gooseneck, it is stated, the front-end loading of a crane can be safely and easily accomplished by one man in as little as five minutes time.

For more information circle 146 on Service Coupon Page 16 and mail now.

Manufacturers' Literature

Lorain "50"

A new 2-color catalog describing the fully air-controlled, crawler mounted Lorain "50" is now available from the Thew Shovel Co., Lorain, O. The new catalog describes and illustrates the many new features incorporated in the "50", long a popular model in the 1-yd. class, and which have been designed to lessen operator fatigue, give faster work cycles and provide trouble-free operation. Action views of the new "50" show it in use as a crane, shovel, clamshell, dragline and hoe.

For more information circle 147 on Service Coupon Page 16 and mail now.

Lubricating Equipment for Contractors

A new catalog illustrating and describing complete, portable field lubricating equipment for contractors has been announced by Gray Co., Inc., 1074 Sibley St., N. E. Minneapolis 13, Minn. This No. 701 Catalog describes in detail Graco Convoy Luber equipment available as complete ready-to-operate units, or, as "Job-Planned" field lubricators that the contractor can assemble to fit his particular requirements. Also shown, is a complete selection of lubrication accessory equipment. Detailed, typical "Job-Planned" Convoy Luber diagrams, with complete bill of materials, are illustrated to aid the user in step-by-step planning of his field lubricator. These "Job-Planned" Convoy Lubers can be assembled by the user's own mechanics or at the Gray Company plant.

For more information circle 148 on Service Coupon Page 16 and mail now.

Good Practice in Sewer Construction

A new 4-page, fully illustrated bulletin entitled "Good Practice in Sewer Construction" has been published by the Clay Sewer Pipe Association, 311 High-Long Bldg., 5 East Long St., Columbus 15, O. Complete data on proper technique for finishing, backfilling, inspection and trench preparation, including trench width, depth and type of bedding, are included.

For more information circle 149 on Service Coupon Page 16 and mail now.

Forming Equipment

Two new catalogs describing in detail different lines of its forming equipment have been issued by the Symons Clamp & Manufacturing Co., 4249 Diversey Ave., Chicago 39, Ill. One catalog shows the firm's line of Mag-ply forms and the other illustrates Symons steel-ply forms. Both kinds of forms utilize plastic coated plywood with steel used as a frame to enclose one type and magnesium the other.

For more information circle 150 on Service Coupon Page 16 and mail now.

Earth-Moving Machinery Attachments

"Speaking of Attachments" is the title of an 8-page booklet (Form DE 589) published by Caterpillar Tractor Co., Peoria, Ill., dealing with the profit-making aspects of earth-moving machinery attachments. The illustrated booklet demonstrates that the right attachment and the proper application combine to produce increased profit for the machine owner. Also included are tips on determining when and where attachments can be profitably used.

For more information circle 151 on Service Coupon Page 16 and mail now.

Shovel-Cranes

A new, condensed catalog of the complete line of Link-Belt Speeder shovel-cranes, Book 2577, has been released by the Link-Belt Speeder Corporation, Cedar Rapids, I. The new 8-page, 2-color catalog features a 4-page center display with descriptions of 18 crawler-mounted models ranging from ¾ to 3 yd., 8 to 75 ton capacities; five truck-cranes with capacities from 12½ to 35 ton; and four self-propelled, rubber-tires models with capacities from 15 to 35 tons. The catalog

gives descriptive information on the more than 20 new models, all fully convertible to any standard front-end attachment, which have been introduced by the Link-Belt Speeder Corporation in the last few years. The catalog also includes a fully-illustrated description of Speed-o-Matic, a Link-Belt Speeder exclusive feature which provides full hydraulic power control, which is said to allow output increases of as much as 25 per cent.

For more information circle 152 on Service Coupon Page 16 and mail now.

Snow Plows and Spreaders

A 4-page circular is available from Good Roads Machinery Corporation, Minerva, O., on its line of snow plows and spreaders. Four types of snow plows, V-plow, reversible blade plow, one way plow and rigid one way plow are illustrated and described. Illustrations and descriptions of three models of spreaders are included.

For more information circle 153 on Service Coupon Page 16 and mail now.

Bridge Rehabilitation

A new 12-page technical report, No. 101, published by Intrusion-Prepakt, Inc., has been prepared for those responsible for the maintenance and repair of bridges. It provides basic data and information on Intrusion-Prepakt techniques for the restoration and strengthening of bridge piers, abutments and structural members. Two technical articles on the rehabilitation of piers and abutments are included in the report plus eight detailed case histories. The report can be obtained from J. A. Bader, Chief Sales Engineer, Intrusion-Prepakt, Inc., Room 568, Union Commerce Building, Cleveland 14, O.

For more information circle 154 on Service Coupon Page 16 and mail now.

Forms for Precast Concrete

A bulletin describing inexpensive new forms for precision manufacturing of precast concrete double-tee slabs has been issued by Irvington Form and Tank Corporation, 20 Vesey St., New York 7, N. Y.

For more information circle 155 on Service Coupon Page 16 and mail now.

Deck Truck for Special Loads

New literature describing the functional advantages of the White 300 Util-I-Deck truck has just been released by The White Motor Co., Cleveland 1, O. The new unit has been developed by White for handling structural beams, steel fabrications, telephone poles and large diameter tubing. The unit is stated to provide 22% greater payload capacity for these specialized loads and is engineered specifically for steel producers, warehouses, fabricators and erected, along with other companies handling difficult loads.

For more information circle 156 on Service Coupon Page 16 and mail now.

Power Lubrication Systems

Details on recent developments in power lubrication systems are featured in a new catalog published by Lincoln Engineering Co., 5702-42 Natural Bridge Ave., St. Louis 20, Mo. It gives complete centralized lubrication systems, including those recently adopted as optional factory-installed service accessories by leading manufacturers of automobiles, truck-trailers, and industrial machinery. The book covers description and functions of manual as well as both mechanical and electric automatic controls, together with photographs of the various types of installations, diagrammatic illustrations, and information on ordering.

For more information circle 157 on Service Coupon Page 16 and mail now.

Diamond Blades for Concrete Cutting

A new pamphlet published by Clipper Manufacturing Co., Suite 749 Warwick, Kansas City 8, Mo., explains the terms and names used in the manufacture of diamond blades for masonry and concrete cutting. "Black diamonds" and "secondary abrasives" are fully explained, as are the terms "metal bonds," grit sizes," "steel centers" and "diamond concentration."

For more information circle 158 on Service Coupon Page 16 and mail now.

Methods for Jointing Clay Pipe

Five tested methods for jointing vitrified clay pipe are described in a new bulletin offered by the Clay Sewer Pipe Association, 311 High-Long Bldg., 5 East Long St., Columbus 15, O. This 2-color, 4-page bulletin gives instructions for jointing hot poured bituminous joints, wedge-lock joints, pre-cast bituminous joints, mortar joints and pressure joints. Information on preparing trench beds and backfilling also is included.

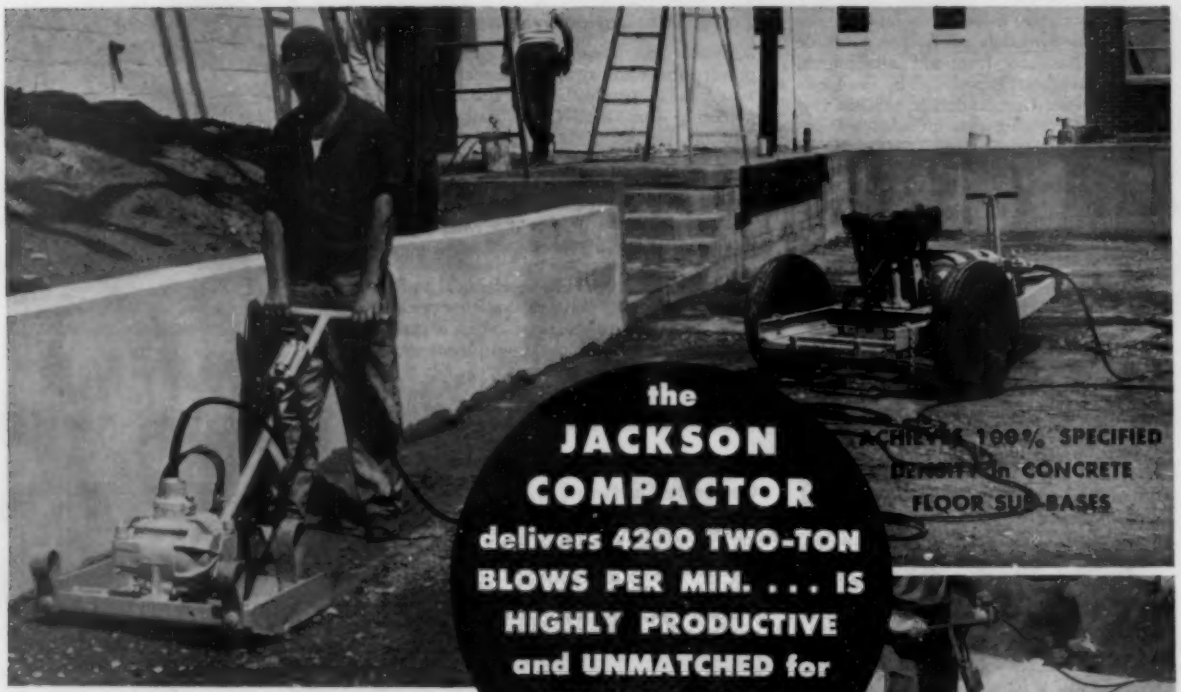
For more information circle 159 on Service Coupon Page 16 and mail now.

35 Ton Crane

A 16-page catalog describing its new 35-ton Lorain Moto-Crane, model MC-530W, has been published by The Thew Shovel Co., Lorain, O. The heavily illustrated publication describes fully several of the new features of this entirely new design, high capacity, heavy-duty lifting crane that is transportable over the highways. The catalog also pictures the new rubber-tire carrier designed for the "MC-530W" that can be supplied with 6 x 6, 6 x 4 or 8 x 4 axle arrangements. The 8 x 4 carrier permits greater lifting capacities without the use of outriggers and the double front axle gives better load distribution for improved off-the-highway travel and doubles the front axle carrying capacity to help meet highway load limits.

For more information circle 160 on Service Coupon Page 16 and mail now.

(Continued on page 248)



the JACKSON COMPACTOR delivers 4200 TWO-TON BLOWS PER MIN. . . . IS HIGHLY PRODUCTIVE and UNMATCHED for VERSATILITY and CONVENIENCE!

ACHIEVES 100% SPECIFIED DENSITY in CONCRETE FLOOR SUB-BASES

The JACKSON VIBRATORY COMPACTOR, together with a JACKSON auto-trailer-generator unit equipped to quickly pick up and lower the Compactor, is the handiest, most efficient and versatile outfit imaginable for compacting both granular soils and blacktop in an almost unlimited variety of applications. In granular soils 100% specified density is readily achieved in 10" layers at the rate of 1800 sq. ft. per hour. 5" layers of bituminous mixes are also compacted close to maximum density at the same rate of production. And when a twin hookup is used, such as shown below, one man can easily double this production since the machines are self-propelling and need only be guided by the operator. (THE JACKSON IS THE ONLY COMPACTOR WHICH CAN BE USED IN TWIN HOOKUP.) Quickly interchangeable bases of 12" to 26" widths is another feature that adds to the great versatility of the JACKSON COMPACTOR. For consolidating sub-bases of concrete floors, bridge approaches, compacting in trenches, close to abutments, pavement widening sub-bases, patching and widening bituminous pavement and paving blacktop walks and drives this is the greatest money-making outfit you will discover anywhere. See it at your Jackson Distributor. His name and literature gladly sent on request. Write, NOW!

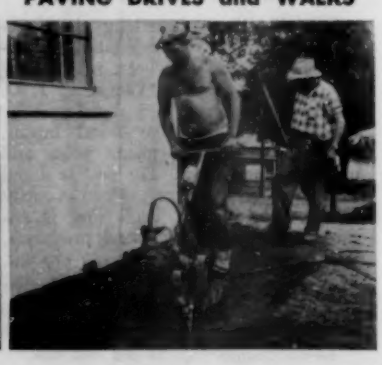
BACKFILL ▲▼ TRENCHES

JACKSON VIBRATORS INC. LUDINGTON, MICHIGAN

TWIN UNIT DOUBLES PRODUCTION

PAVEMENT PATCHING

PAVING DRIVES and WALKS



. . . for more details circle 257, page 16

Concrete Equipment
ALSO
Grading Equipment

3 Cement Bins connected together, total capacity 1373 bbls., Blaw-Knox Service Bin and two Johnson Silos with bucket conveyor, screw conveyors, truck dump hopper and air compressor $10,000.00

1 Cleveland Subgrader, pull type multiple blade, and scarifier, S/N 54X68, like new 2,000.00

1 Lot 1900 ft. Heltzel Road Forms, 9" high, 8" base with locks and pins, in excellent condition, per lineal ft. 1.50

2 DeWalt Radial Saws, ea. .. 400.00

9 Master Vibrators, electric, ea. 200.00

1 Hydra Hammer, 4 pneumatic tires, Wisconsin engine, S/N 828 ..... 4,500.00

Grading and Other Equipment

1 Buffalo-Springfield Roller, 10 ton, S/N 18680, w/Waukesha gas engine, a good roller.

1 5-8 Ton Buffalo-Springfield Roller, S/N 21936.

1 Parts Trailer with bins installed.

2 Cat DW10 Tractors and Model 10 Caterpillar Scrapers.

2 D8 Cat Tractors, with Angle Blades.

1 D8 Cat Tractor with push plate and Double Drum Power Unit.

1 D7 Cat Tractor with push plate and Double Drum Power Unit.

1 Model HD20 Allis-Chalmers Tractor and GarWood Angle Blade.

3 Scrapers, GarWood 25 cubic yard.

1 Air Compressor, Gardner-Denver, 210 ft.

1 Air Compressor, Worthington, 105 ft.

1 LeTourneau Ripper, heavy duty, 3 tooth.

Contact Us For Prices On Any Not Priced. All This Equipment In Good Condition And Ready To Do A Job. All Of This Equipment Is Subject To Prior Sale.

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Hard Chrome Plated

CAMSHAFTS REGROUND

Connecting Rods Rebuilt

Rotary Process Hard Chrome—Magnafluxing—Electric Heat Treating. Serving National Railroads, Bus and Truck Companies, including Diesel Equipped.

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1 - GM 6-71, late model, 6045C, rebuilt by us, all standard sized, Fan-To-Flywheel, spare for 600 cu. ft. Air Compressor $2,750.00
1 - GM 3-71, Fan-To-Flywheel for ¾ yd. shovel, rebuilt 1,225.00
2 - Cat D8800 complete power units with clutch, good running shape, both for 4,250.00
2 - Buda DCS-1879, Fan-To-Flywheel engines recently overhauled, each at 3,350.00

GENERATOR SETS

1 - 500KW Portable Power Plant, GM 12-278A, AC 3/60/400V, excellent equipment.
1 - 250KW Portable Power Plant, GM-8268A, w/radiator and switchgear.

RADIATOR ASSEMBLIES

Core Size 36"x33"x4", sectionalized, w/oil cooler section suitable for 250 H.P. ..... $ 157.50
Core Size 33"x33"x3" for 125 H.P. 85.00

GENERATORS

2 - 32KVA single big generators w/switch gear, 3/60/220 V, each ..... $ 450.00
16 - 205KW West Type 187A, 305/600V @ 1200 RPM, new, each 1,850.00
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Preston W. Duffy & Son
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3½ yd. Dragline P&H, Model 1055 L.C., Serial #11370, Caterpillar Diesel Motor, model 375, Serial #16B170, magnet torque electric swings, 80' Boom includes 3½ yd. Dragline with essco Bucket, lite plant, recently overhauled at a cost of $15,000 in repairs, excellent condition. Available immediately, located upper New York state. F.O.B. Bedford, Ohio. Subject to prior sale. For further information call or write:

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1 Bucyrus-Erie heavy duty dragline, 30" pads, GM diesel 371 engine, 40' boom, 1 yd. Hendrix bucket. Tip top condition. - Bought new August 1955 ..... $18,500.00

1 K12 Easley equipped 11'3" long tracks, 24" shoes, 6800# counter weights, double hook rollers, independent boom hoist, 35' boom, ½ yd. Page bucket and backhoe attachment, 24" bucket, Caterpillar D-311 diesel engine. - Bought new June 1955 ..... 12,500.00

2 TD-18 Bulldozers - good condition. Each 5,500.00

1 TD-18 Bulldozer - Nearly new rails - good condition 4,500.00

1 TD-18 Bulldozer - needs some work 2,500.00

1 S 91 Bucyrus-Erie scraper - good rubber. Ready to go 4,500.00

1 S 90 Bucyrus-Erie scraper - good condition 4,000.00

1 #12 Cat Patrol with closed cab, booster steering, motor tip top.. 7,500.00

1 HD-6 End loader, practically new 12,500.00

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Steam Pile Hammers and Extractors

- DROP HAMMERS
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110	MP-115	60 ft.	Kansas City
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244	MP-116	35 ft.	Wisconsin
260	MP-112	14 to 17 ft.	Iowa
160	MP-116	28 to 30 ft.	Colorado
130	MP-112	19 to 25 ft.	Montana
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CONTRACTORS MACHINERY COMPANY
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WANTED

Good Used Scalper Crusher Unit with approximately 4x10 screen and 12x36 Jaw Crusher. With or without power.

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Bailey Steel Truss Type
Portable & Fully Prefabricated
Variable Span & Capacity
Cantilever Erection

Excellent For

Construction detours — Contractors' access
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SHOVELS
DRAGLINES
CRANES
SPARE PARTS

5 Model 1201 (Cummins L Diesel) 3½ yard.
4 Model 802 (Cat and GMC Diesel) 2 yard.
MANUFACTURED 1947, 1948, 1949
Machines Require Overhaul And New Cabs

FOR SALE CHEAP

ATTACHMENTS: Shovel Fronts, Booms, Fairleads, Lightweight Drag Buckets.

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LOOK!

1201 LIMA DRAGLINE, 80' Boom, Cummins Diesel Koehler 1500 watt Light plant, 18' crawlers, 44" treads, 3 yd. Page Drag Bucket. Machine new 3/30/-51. Immediate delivery. Price on cars—$70,000.00. Condition excellent!

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1,000 to 18,000 lb. Cap.
From $500 Pp
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HD-10 ALLIS-CHALMERS DOZER with 9½ foot blade; double winches; equipped with GM-470 Diesel engine completely overhauled; new main and rod bearings; new sleeves; pistons; rings; valves and injectors; all bushings and pins renewed where necessary; all tracks, idlers and sprockets built up with high tensile welding rod; seals renewed in rear wheels; new batteries. Ready for immediate service. Will demonstrate locally. Price $6,500.00 FOB Mobile, Ala. Call collect. W. E. Carr, Phone HE-32696.

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TRUCKS, 15, 22 & 35 Ton
BUCYRUS-ERIE Draglines, 2½ yd to 13 yd.
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NORTHWEST Draglines, ¾ yd. to 2½ yd.
NORTHWEST Shovels, ¾ yd. to 2½ yd.
MANITOWOC Draglines, 2½ yd. to 5 yd.
MANITOWOC Shovels, 2½ yd. to 5 yd.
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2400 LIMA SHOVEL FRONT attachment
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6" and 9" Drills, Diesel & Electric
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ASPHALT PLANT

5000 LB. SIMPLICITY

Complete plant ready to operate including
3—20,000 gal. asphalt tanks with coils
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Pacific Steel Boiler Cat. #5281, Serial 23377, SBI Rating 12,150 sq/ft gas burner with provision for coal. Has 28" diameter 55 foot stack—good condition.

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SLIGHTLY USED U.S. GOVERNMENT SURPLUS

Cranes, Rollers, Bulldozers, Trailers

- Koehring Crawler Crane, Model 304, ¾ yard, with 40 foot boom, excellent, 1951 ..... $10,000.00
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All Prices F.O.B. Cleveland, Ohio

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1—Backhoe Attachment for Model 25 Northwest. Late model, good condition—$2,000.00.

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1—Biederman tandems, cabin chassis.

1—Model 331 Marion ¾ yd. Crane or Drag—Cheap.

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INSLEY L, ¾ cu. yd. Backhoe. New 1953. Little used. Excellent. $8250.00. Rental purchase. Yard.

OSGOOD 12 ton Motor Crane, current model. Tandem Carrier. Tires 1000 x 20. Fore & aft. outriggers. 59' boom w/jib. Excellent $6500.00. Rental purchase. Yard.

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EXCEPTIONAL TIRE BARGAINS

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1100-20-14 ply New Highway Type	$35.00
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1550-20-14-16-20 ply Good Used ..	12.50
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NEARLY NEW CONCRETE BATCHING PLANT - USED ONLY 40 DAYS

Fully Automatic Noble Plant, Purchased For Specific Job Just Completed.

OUTSTANDING FEATURES INCLUDE:

150 ton, 3 compartment aggregate bin.

Two 500 barrel elevated cement silos.

Two cement feed screws.

3½ yard weigh hopper—separate cement scale.

Two cement or flyash bucket elevators (320 barrels capacity each per hour) with 12 inch receiving screws and railroad shroud type receiving hopper. (Will sell only one, if desired.)

Ladders with safety guards to top of silos.

Electrical panel with fused disconnect switches and magnetic starters for each motor. Entire plant wired with plug type connectors.

300 gallon automatic water scale.

Quickly convertible to either central mix or transit mix installation.

Capacity To Mixer Trucks Over 100 Cubic Yards Per Hour.

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1 Buffalo—Springfield Roller Model KT-24B, Gas Power, New in 1949—overhauled.

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HEIL SCRAPER MODEL C12

12 yard capacity with cable control. Priced to sell at.....$3,500.00

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Model HD14B with Double Drum Power Control Unit. Priced at.....$4,000.00

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Unit 10-20A Diesel Crane

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Pioneer—Oro 42" Feeder

Telsmith 4 x 10 d.d. Screen

Pioneer 30" x 128' Conveyor

Int. TD-14 and B. E. Bulldozer

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PORTABLE ASPHALT PLANT COMPLETE

Hetherington & Berner PA 30 Plant—4,000 lb. pug mill diesel driven. Fluidometer. Has fifth wheel.

Hetherington & Berner 60" x 30' dryer, diesel driven complete. Hopkins low pressure burners, fuel oil pump. Has fifth wheel.

Cold feeder 60-ton 3-compartment bin with oscillating plate feeders, cold bucket elevator, exhauster, dust collector including liquid precipitator dust eliminator.

Cleaver Brooks boiler.

1—10,000 gal. insulated asphalt tank complete with steam jacketed piping with asphalt pump.

1—10,000 gal. fuel storage tank.

1—20-ton Winslow platform scale.

A quantity of spare parts.
Very good condition. Located in Northern Indiana.

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Koehring #34 E. Dual Drum Paver #19910.
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Cat. #12 Grader #8T 3027.
Cat. #12 Grader #8T 706.
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Model 848 Barber-Greene Asphalt Plant Complete.
Cat. #20 KW Light Plant.
Hopkins Low Pressure Burners.

All of above equipment located in Southeast

UNITED SOUTHERN CONTRACTORS INC.
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1 Construction Machinery Co. 11S End Discharge Concrete Mixer on four pneumatics with Wisconsin VE-4 #14 air-cooled engine and with power loader, skip bumper and accurmeter water tank - Excellent condition - Practically New.

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MODEL	Stock No.	Co-Shaft RPM	H.P.
MASTER, Style 69683	1699-40	58	½
MASTER, Style 69681	1699-125	96	½
MASTER	1699-98	190	½
MASTER, Style 112963	1699-107	30	¾
MASTER, Style 70035	1689	72	¾
MASTER, Style 70529	1699-124	96	¾
MASTER, Style 69689	1699-110	58	¾
MASTER, Style 106308	1699-123	96	1
U.S. SYNCHROGEAR	1688	68	3
U.S. SYNCHROGEAR, Type SD-GH2	1699-102	190	3

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30-day unconditional guarantee!
Performance Like New!

FALK MOTOREDUCER

MODEL	Stock No.	Ratio	H.P.
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FALK, Size 44-DU (less motor)	1582	29.5-1	15
FALK, Size 3041-DUC (less motor)	1599-9	17½-1	30
FALK, Size 956-DZ (less motor)	1581	32.64-1	40
FALK, Size 44-RZ	1599-1	50-1	10
FALK, Size 40-RS (less motor)	1570	63-1	7½
FALK, Size 40-RZ (less motor)	1578	71.1	5

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Pulverizing Plant complete for producing agricultural lime dust or asphalt filler, consisting of:

1—Allis-Chalmers 7' x 24' Compeb mill complete with motor and magnetic clutch.

2—6' x 60' Dryers.

1—Sturtevant Air separator.

1—Fuller Kinyon pump for pumping dust to hopper or barges.

In addition we have other equipment in this plant such as screw conveyors, bucket elevator, screens, etc.

For information write:

New York Trap Rock Corporation
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New York 17, New York

MAGNETIC PULLEYS

6—Dings Electro, 220 volts D.C. 12" dia., 22" face, 2" shaft, length of shaft 50".

5—Dings Electro, 220 volts D.C. 12" dia., 16" face, 34" shaft, shaft dia. 2".

Used, but in good condition.

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Christian 2D Hoist & Swinger, 128 HP Buda Diesel Engine. 15,000# SLP.
2 100 HP Lucey Portable Horiz. Fire-Box Boilers. 200 lbs. Oil Fired. ASME.
25 ton American Steel Guy Derrick.
30 Ton Steel Stiffleg Derricks 125' bm.
25 ton Ohio Diesel Loco. Crane 1947.
1½ yd. Northwest No. 6 Diesel Crane 1948.
1½ yd. Bucyrus-Erie 88-B Diesel Crane 1948.
5 yd. Manitowoc 4500 Shovel-Dragline.
75KW Cat. Diesel Generator 3/60/440.

MISSISSIPPI VALLEY EQUIPMENT CO.
515 Locust St.
ST. LOUIS 1, MO.

FOR SALE

Trailer, Lowboy, U. S. Engr. Type, 2 axles, in line, 8-825 x 20 tires. $1,500.

Unusued Govt. Pontoon Trailers, 31'3" long, 8' wide, 1200 x 20 tires, air brakes. $750 each.

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Northwest - Bucyrus-Erie - Lima - Marion - Link Belt - Lorain - P&H - Manitowoc. Shovels - Backhoe - Clam Drag - all sizes.

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Lowest Prices - Complete Satisfaction Guaranteed

NEW and Guaranteed REBUILT ENGINES

Completely Dynamometer "Run-in" and Tested in our own modern, extensive rebuilding shops.

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QUALITY — SERVICE — ECONOMY

MUTUAL TRUCK PARTS Co., Inc.

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FOR SALE
CRANES & BACKHOES

(1) Link Belt, model LB68 with 30 inch tracks, late 1955 model with ⅝ yd. backhoe, new condition $17,600.00

(1) Link Belt 12½ ton truck crane, model HC51, serial No. 6CHC66 with 80 ft. of boom. Excellent condition $15,500.00

(1) Quikway Crane, model E, ⅜ yd., serial No. 5481, mounted on a new carrier, crane good cond., carrier new $8,900.00

(1) Quikway Crane, model L, ½ yd., serial No. 21781-Q3D, not mounted, good condition $7,500.00

(1) Northwest Dragline with dragline boom and ¾ yd. backhoe attachment, serial No. 11870, very good condition $11,500.00

(1) 10-E Dble. drum Koehring Paver Self Propelled Paver. Steering on Rubber. Excellent condition. Reasonable.

ROCK DRILLING EQUIP.

(1) Jasper Air Compressor, model 365, rotary, serial RC18230 with Thor model C-1700 Tumbo boom arm and column, Thor #77062 saddle and cone assembly, Thor 53648 line oiler and fittings, Ingersoll-Rand drifter, model BIX7, serial No. 580237, mounted on 3 ton 6 by 6, model M"H6 International truck, compressor boom and drifter purchased new in May 1956. Excellent condition, ready for use. .$14,900.00

PUMPS

(25) Gorman-Rupp 3" diaphram pumps mounted on rubber tired carts, model 3D8M6, excellent condition. All purchased new in 1956. Each $225.00

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Pettibone "175D" Demonstrator 1¾ yd. (Struck) Tractor Shovel, 4-wheel drive, power shift transmission, planetary axles. New Guarantee.

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Barber-Greene "522W" Bucket Loader, rubber-tired, reduced to sell.

Adams "411" Diesel Motor Grader, Cab and Scarifier.

Barber-Greene "705" RT Runabout Ditcher, digs 4½ ft. deep.

Chicago Pneumatic "60" Reconditioned Portable Compressor. We have 3 of these from $800 to $1250.

Universal "2036" R.B. Jaw Crusher, skid-mounted, w/Apron Feeder.

Bayport 23 yd. New Aggregate Bins.

Caterpillar "D318" Diesel Electric Generator Set, 40 KW.

Caterpillar "D13000" Diesel Power Unit.

NOTE: All This Equipment Located in our Yard.

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CRAWLER TRACTORS

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Manufacturers' Literature

Bituminous Plant

A new 12 page folder, describing its Model 840-B continuous-mix asphalt plant, has been announced by Barber-Greene Co., 400 No. Highland Ave., Aurora, Ill. The Model 840-B plant, which is rated at 50 tph on cold mixes and 45 tph on intermediate and high type mixes where dried and heated aggregate is required, can be used in several set-ups and combinations of equipment. Thus, it is readily changed from one type of mix production to another. Through use of actual job photos, model photos and cut-away drawings, each plant set-up is individually pictured and the relationship of the various components, ie, mixer, dryer, gradation control unit, elevators, feeders, etc., is shown. Four pages are also devoted to the special operating features of each of the component units.

For more information circle 161 on Service Coupon Page 16 and mail now.

Crane-Excavator

A new 4-page illustrated bulletin (No. C-101) describing the crawler-mounted Model C-35 Bantam, has been announced by the Schield Bantam Co., Waverly, Ia. It contains detailed information concerning the latest specifications, features, capacities and application data for the company's crawler-mounted ¾ cu yd, 5-ton crane-excavator model. Complete machine specifications are listed, and operating ranges and capacity ratings are shown in conjunction with large, easy to read charts covering the crane, shovel and back hoe attachments.

For more information circle 162 on Service Coupon Page 16 and mail now.

Ice and Snow Melting Material

A new technical bulletin, No. 10156, describing Ice-Rem -CF, chloride free ice and snow melting material, has been announced by Speco, Inc., 7308 Associate Ave., Cleveland 9, O. Bulletin discusses physical and chemical characteristics of the new product and the effects these have on various surfaces. It also outlines proper application methods for both large and small surfaces with airport runways and loading ramps serving as examples.

For more information circle 163 on Service Coupon Page 16 and mail now.

Rough Engine Idling

The various causes for rough engine idling are listed in Service Bulletin No. 104 issued by Pennsylvania Refining 2686 Lisbon Road, Cleveland 4, O. According to engineering studies, the most common cause for rough idling is the accumulation of gum, dirt, and carbon deposits in the carburetor. According to the bulletin, periodic cleaning of the carburetor is the only practical solution. The bulletin points out the ease with which carburetors may be cleaned right on the engine in a few minutes time.

For more information circle 164 on Service Coupon Page 16 and mail now.

Guard Rail, Bridge Flooring

A new bulletin on its complete line for the construction industry has been released by United Steel Fabricators, Inc., Wooster, O. USF guard rail, bridge flooring, steel forms for bridge decking, corrugated metal pipe and pipe arch, and steel buildings are fully illustrated and described in detail.

For more information circle 165 on Service Coupon Page 16 and mail now.

Spreaders for Sand and Gravel

"Champion" spreaders for spreading sand, cinders, salt, gravel, calcium chloride and for seal-coating are covered in a 4-page circular available from Good Roads Machinery Co., Minerva, O. Included are illustrations, specifications and dimension tables for gas driven models for hydraulic jet spreader model and for power take-off spreader.

For more information circle 166 on Service Coupon Page 16 and mail now.

Portable Dual Crushing Plant

A brochure on one of its latest developments, the "Comanche," a new portable dual crushing plant, having a range of four sizes, is available from Lippmann Engineering Works, Inc., 4603 West Mitchell St., Milwaukee 4, Wis. Details and specifications of these plants are contained in the bulletin.

For more information circle 167 on Service Coupon Page 16 and mail now.

Low Bed Heavy Duty Trailers

Useful information on low bed heavy duty trailers in capacities up to 90 tons is given in a 4-page circular, available from Rogers Bros. Corporation, Albion, Pa. Twelve types of Rogers trailers are illustrated and described. In addition brief descriptions and illustrations of Rogers' special trailers, three axle tandem trailers, I-beam or girder trailers and the Tag-a-long trailer are included.

For more information circle 168 on Service Coupon Page 16 and mail now.

Earth Boring Machines

A new 16-page illustrated booklet covering its complete new line of earth boring machines is available from Hydrauger Corporation, Ltd., 681 Market St., San Francisco, Calif. It includes interesting field operation photographs, showing embankment drainage and pipe line installations.

For more information circle 169 on Service Coupon Page 16 and mail now.

With the Manufacturers and Distributors

CHAIN BELT ACQUIRES GENERAL ROAD MACHINES. Chain Belt Co., Milwaukee, Wis., has acquired General Road Machines, Inc., Niles, O., and for the time being will operate it as a wholly owned subsidiary. General Road Machines manufactures steel forms for concrete road, airport, curb and gutter and sidewalk construction; concrete finishing machines; and other concrete road building equipment. Donald T. Heltzel, president of General Road Machines, will continue as general manager, and J. J. Marcello, vice president of General Road Machines, will be sales manager.

SEAMAN-ANDWALL BUYS VIBRO-JOINT CUTTER. The newly developed Vibro-Joint cutter for concrete road construction, designed and manufactured by Vibro-Joint Co., Inc., Dallas, Tex., has been purchased by Seaman-Andwall Corporation, Milwaukee, Wis. The purchase includes engineering, manufacturing and distribution rights.

HOUGH CO. ANNOUNCES NEW OFFICERS. At a special meeting of the board of directors of The Frank G. Hough Co., Libertyville, Ill., a subsidiary of International Harvester Co. Frank G. Hough, founder and president of the company, was elected to the newly created office of chairman of the board of directors. G. A. Gilbertson, formerly executive vice-president and general manager, was elected president and chief operating officer.

BRADEN APPOINTED GENERAL MANAGER. The appointment of R. O. Boden as general manager of the parent Heltzel Steel Form and Iron Co., Warren, O., has been announced by Carl J. Heltzel, president, who relinquished that position to devote more of his time to company policy. Mr. Boden, as general manager of the Heltzel organization, will conduct the affairs of the Flexible Road Joint Machine Co., Warren, O. and The Ohio Structural Steel Co. of Newton Falls, O., as well as those of Heltzel.

ECK PROMOTED BY GRANCO STEEL. Charles Eck, formerly district sales manager in Kansas City, Mo., for Granco Steel Products Co., has been promoted to product manager of highway products, with headquarters in the company's St. Louis office. Louis Schaefer succeeds Eck as manager of the Kansas City office.

NEW CLEAVER-BROOKS DISTRIBUTOR. C. J. Grant Co., 2515 Willow St., Oakland, Calif., has been appointed manufacturer's representative by Cleaver-Brooks Co., Milwaukee, Wis., for sale of its asphalt heating and pile driving equipment.

DAVEY PROMOTES EDGEWELL. G. B. Edgewell, affiliated with Davey Compressor Co., Kent, O., since 1940, and

since 1955 director of automotive engineering, has been appointed manager of the engineering department.

H & R Names Krebs. William G. Krebs has been appointed director of sales of Harrington & Richardson, Inc., Worcester, Mass., and Rowco Mfg. Co., Inc., Keene, N.H., an H & R subsidiary. Carl H. Howe, Jr., has been appointed sales manager of Harrington & Richardson and Brushmaster companies.

Hall Named General Sales Manager. Charles C. Hall, formerly sales manager of highway products division of United Steel Fabricators, Inc., Wooster, O., has been appointed general sales manager of the company.

D'Amato Appointed Product Manager. James G. Morris, industrial sales manager for Seaman-Andwall Corporation, Milwaukee, Wis., has announced the appointment of Frank D'Amato as product manager for their line of Century material spreaders. Mr. D'Amato has been designing and sales engineer for Centry Engineering Co., Waukesha, Wis., for eight years prior to the purchase of that company's line of Century materials spreaders by Seaman-Andwall.

New Vice Presidents Oliver Corporation. Samuel W. White, Jr., and Donald W. Koegle have been elected vice presidents of the Oliver Corporation, Chicago, Ill. Mr. White will head the industrial sales division and Mr. Koegle will have charge of domestic farm machinery sales. Edward H. Fisher, vice president, formerly manager of the industrial sales division, has been appointed head of the newly created special products division.

Berube Promoted by Le Roi. Stephen C. Berube, heretofore a district representative, has been named manager of the central sales region of Le Roi Division, Westinghouse Air Brake Co., Milwaukee, Wis. Headquarters for the Central regional manager, truck sales, subregion includes the states of Wisconsin, Iowa, and Minnesota, and portions of Illinois, Michigan, Nebraska, South Dakota, and North Dakota.

PERSONNEL CHANGES BY HARVESTER. Ralph G. Greer, formerly manager of Harvester's Washington, D.C. office, has been appointed assistant sales manager of the Construction Equipment Division of International Harvester Co., succeeding C. E. Jones, who has been named supervisor of national contractors' sales. Thomas E. Aughinbaugh, formerly central regional manager, truck sales, succeeds Mr. Greer in the Washington office.

BROUGH PROMOTED BY HERCULES MOTORS. Walter L. Brough, who has been serving as assistant to the president since joining the organization two years ago, has been promoted to the office of executive vice president of Hercules Motors Corporation, Canton, O.

MILLER SPREADER ESTABLISHES RESEARCH DEPARTMENT. In keeping with progressive plans to expand its product line, Miller Spreader Corporation, Youngstown, O., recently announced the creation of a research and design department. Robert L. Wymer, Jr., has been named chief industrial engineer. Jack Foster has been promoted to chief design engineer. The two men will head up the new research and design department.

NEW MANAGEMENT APPOINTMENTS BY WAGNER. James G. Dean formerly vice president in charge of sales for Wagner Iron Works, Milwaukee, Wis., has been named vice president and assistant to the president; William J. Schlapman, formerly sales manager of Wagner's tractor loader division, has been promoted to vice president in charge of sales.

BROS APPOINTED ASSISTANT SALES MANAGER. Donn Bros, heretofore technical adviser to Bros distributor organization, has been appointed assistant sales manager for Wm. Bros Boiler & Mfr's. Road Machinery Division, Minneapolis, Minn.

PEARSON PROMOTED BY HYSTER. John V. Pearson has been appointed supervisor tractor equipment advertising and promotion for Hyster Co., Portland, Ore. Since 1953 Mr. Pearson has been assigned to the tractor equipment division of the Hyster sales promotion department in Portland, Ore.

PHILIPPI APPOINTED AUTOCAR REPRESENTATIVE. L. B. Philippi, formerly eastern regional sales manager for Dart Truck Co., Kansas City, Mo., has been appointed to the newly created position of off-highway field representative for Autocar Division of The White Motor Co., Exton, Pa.

LOCKE APPOINTED SALES MANAGER. Robert E. Locke has been appointed manager of highway sales for Kaiser Aluminum & Chemical Sales, Inc., Chicago, Ill. In his newly created position he will direct sales activities in the use of aluminum in trucks, trailers, highway signs, bridge railings and other highway applications.

JOY MAKES ORGANIZATIONAL CHANGES. Joy Manufacturing Co., Pittsburgh, Pa., has announced significant changes in the company's organizational structure which involve the establishment of three new general management positions at the vice presidential level. James A. Drain has been named to the newly created post of vice president and general manager of the firm's Mining and Construction Division. Similar appointments were made in Joy's Coal Machinery Division where Hugo C. Nyquist has been named, and in the Industrial Division which will be headed by Louis G. Helmick.

RIDDLE APPOINTED PRODUCT MANAGER. C. Frank Riddle has been appointed product manager for the Pulvi-Loader division of Seaman-Andwall Corporation, Milwaukee, Wis. Mr. Riddle for the past two years has been design and sales engineer for the Willimon Mobile-Loader manufactured by J. R. Prewitt & Sons, Pleasant Hill, Mo., prior to the purchase of the equipment by Seaman-Andwall.

KOEHRING AND BUFFALO-SPRINGFIELD MERGE. Koehring Co., Milwaukee, Wis., and the Buffalo-Springfield Roller Co., Springfield, O., have been merged. Koehring is the surviving corporation. Buffalo-Springfield will be operated as the Buffalo-Springfield Roller Division of the Koehring Co. Carl F. Greiner, president and his brother Edward E. Greiner, executive president of Buffalo-Springfield will retire. Other company officers will continue. John F. Harrison, currently vice president will continue in the capacity.

INDEX TO ADVERTISERS

THE CASE OF
THE DANGEROUS DRUMS

THANKS FOR DROPPING BY, ART. I THINK I NEED A SET OF NEW INJECTION VALVES.

HMMM, YOUR TRACTOR'S NOT VERY OLD. SHOULDN'T NEED VALVES.

SURE ACTS LIKE IT. THE ENGINE IS MISSING AND LOSING POWER!

BET YOUR TROUBLE'S RIGHT HERE, FRED ----LOOK AT THE WATER IN YOUR FUEL!

FRED, YOU NEED BETTER FUEL STORAGE FACILITIES. WATER AND RUST ACCUMULATE IN THESE DRUMS AND THERE'S NO EASY WAY TO DRAIN IT AWAY. JUST IN CASE THOSE VALVES ARE STICKY, I'LL BE GLAD TO CLEAN AND TEST THEM.

WE CLEANED THE VALVES, FRED. THEY CHECKED O.K. AND ARE READY TO GO.

THANKS, ART. YOU SAVED ME MONEY. BY THE WAY, I ORDERED A NEW FUEL STORAGE TANK TODAY!

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co

CAT CARE FOR LONGER WEAR

LET ME HELP KEEP YOUR CAT* EQUIPMENT ON THE JOB!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

. . . for more details circle 181, page 16

Proved under 88,000 vehicles a day on the Benjamin Franklin Bridge

CONTRACTOR

Texaco Asphalt paving on both bridges was constructed by the Union Paving Company of Philadelphia.

Laying two-course Texaco Asphaltic Concrete pavement on the Walt Whitman Bridge at Philadelphia.

Texaco Asphaltic Concrete paving serves new Walt Whitman Bridge

The Benjamin Franklin Bridge, which links Philadelphia with Camden, N. J., over the Delaware River, is one of the nation's busiest traffic arteries. It is used daily by more than 88,000 cars and trucks. Serving this traffic day in and day out is a resilient, heavy-duty Texaco Asphaltic Concrete pavement.

To relieve congestion on the Benjamin Franklin Bridge, the Delaware River Port Authority has erected a new span, the Walt Whitman Bridge, connecting Philadelphia with Gloucester, N. J. This, too, has been paved with Texaco Asphaltic Concrete.

The rugged durability and low upkeep cost of Texaco Asphaltic Concrete under heavy bridge traffic strongly recommend this pavement wherever heavy traffic must be served. In particular, it is the ideal type of construction for the Interstate Highway System. One of its chief advantages is that its initial cost, when it is laid on a flexible base, is substantially lower than comparable rigid paving.

Helpful information on methods and materials recommended for high-type Texaco Asphaltic Concrete is supplied in a booklet, "Texaco Asphalt Paving—Plant-mixed Types." Copy may be obtained without obligation by writing our nearest office.

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. . . for more details circle 282, page 14